Nature Study

— AND —

Elementary Agriculture

D. W. HAMILTON

MACDONALD COLLEGE

Lesson Topics in Nature Study
AND
Elementary Agriculture
FOR
Rural Schools

D. W. HAMILTON, Ph.D., B.S.A.

Lecturer in Nature Study and Elementary Agriculture, School for Teachers, Macdonald College.

MACDONALD COLLEGE
McGILL UNIVERSITY
May, 1915

Nature Study and Elementary Agriculture

By D. W. Hamilton

NATURE-STUDY AIMS.

Educationists are generally agreed that the chief purpose of education is "the formation or development of right character." What is character? The Standard Dictionary says that character is "the individuality which is the product of nature, habits and environment." One writer defines character as "an inward grace of which reputation should be the outward and visible sign." Recent events have recalled the statement "there is a character of ages as well as of nations."

We now ask the question, what determines character? There are two important factors, heredity and environment. Heredity is an inheritance from Nature and is fixed. Whether man was specially created or has developed from the ape, by evolution we have risen to the present level. Man's habits, which he inherits, and all that he is are the result of the struggle for existence with his environment, which has been Nature. In body, mind and soul he has his roots deep in that environment of the race during millions of years.

Natural environment has been a very potent factor in the past. Has it not possibilities of great influence in the present and future? The business of education therefore is to place the child in such environment—or place such environment about the child—as will, reacting with heredity, result in the best development of character. In addition to natural environment, the most important artificial parts of an environment which will act best in the direction of right character are the home, the school, the teacher, and the course of study. The ideal home has often been pictured. It and the school should be in the midst of Nature. The course of study should be firmly grounded in the things of Nature. It should be so planned that the pupil will find "books in the running brooks, sermons in stones, and good in everything." The teacher should be willing and able to make use of Nature constantly in forming the characters of the children placed in her charge. She will not be **able** and **willing** unless keenly sympathetic with Nature. She should be able to say with Byron:

> "There is a pleasure in the pathless woods,
> There is a rapture on the lonely shore,
> There is Society where none intrudes,
> By the deep sea, and music in its roar."

The great **need** is the **teacher,** by whose activity and sympathy the child will, through the school and a close touch with natural environment, develop true character. "But character, like Heaven, is not reached by a single bound. We build the ladder on which we rise, and we mount to its summit round by round."

The primary aim of Nature-Study as a school subject is, therefore, that it serve as one round in the educational ladder which leads to true character. The secondary aims are many. Among these may be mentioned:

1. Development of the observational powers, or alert use of the senses. In this connection let us lay emphasis on the statement "telling is not teaching," particularly in Nature-Study work.
2. Acquisition of information. "Knowledge aids understanding, and understanding, sympathy."
3. Preparation for practical life. This aim is illustrated by the story of the farmer who wanted his boy to learn "more potato-bug and less pussy-willow."
4. To develop the aesthetic nature of the child—love, sympathy and reverence.
5. To give the first steps, or lay a foundation for scientific knowledge and such subjects as geography, literature and art .

WHAT IS NATURE-STUDY?

"Nature-Study is primarily the simple observational study of common natural objects and processes for the sake of personal acquaintance with the things which appeal to human interest directly."—Prof. Bigelow.

"Learning the things in Nature that are best worth knowing to the end of doing those things which make life most worth living."—Prof. Hodge.

"Nature-Study is the direct observational study of common things in the child's environment for the purpose of training the eye and the mind to see and to comprehend, and thus to gain a sympathetic attitude towards Nature for the purpose of increasing the joy of living."—Prof. Bailey.

These men agree as to these essentials:

1. Direct observational study.
2. Common things of Nature.
3. From the standpoint of human interests in Nature as it directly touches our daily life.

The discussion of what Nature-Study, as a subject, is, has led to a pretty general acceptance of certain principles.

1. That Nature-Study should be differentiated from Science. Science is organized knowledge, for example, botany, entomology and geology. The fact that the materials are often the same has no doubt led to the confusion between Nature-Study and Science. Science deals chiefly with principles drawn from grouped facts. Natural Science is concerned chiefly with a close analytical and synthetical study of natural objects and processes for the sake of obtaining knowledge of general principles which constitute the foundations of Science. Nature-Study is the simple observational study of common natural objects and processes for the sake of personal acquaintance with the things which appeal

to human interest. Children need facts, not principles. From Nature-Study they should get something of that naturalist's outlook which Gilbert White found in the fields of Selborne, which Thoreau found at Walden Pond, or John Burroughs finds at Riverby.

"Earth is crammed with Heaven,
And every common bush afire with God;
But only he who sees takes off his shoes."

2. Nature-Study aims at information and discipline. The discipline should lead to habits of thoughtful observation. The information should have intellectual, moral and practical value in the every-day life of the average individual. Both should help to form character.

3. The one fundamental method of teaching Nature-Study is in getting the pupil to see and think for himself. In any subject "telling is not teaching." For Nature-Study in particular books and lectures will not suffice. They may give information, but they do not give discipline.

4. The materials most common and most interesting from the standpoint of every-day life should be selected for study.

5. We must recognize the established principles of child study, that is, child development in body, heart and brain. Nature-Study for the child must be different from Nature-Study for adults.

In conclusion we can say that Nature-Study is now generally recognized as an all-essential part of a rational and liberal elementary education. We cannot wait until there is an unanimous agreement as regards its value and use. If we wait until all agree we might as well say in regard to matters religious, "We won't do anything until God and the devil agree." Therefore let us begin. As Prof. Bailey said, "Let us begin, head end or in any way, but let us begin."

CORRELATION OF SUBJECTS.

NATURE-STUDY AND ENGLISH.

Nature-Study observations and experiments give much excellent subject matter for stories and compositions. In the primary grades children should be encouraged to relate their experiences to the teacher and to the class. In the upper grades the stories may be written. A nature-study topic for a home composition exercise should be given occasionally. In many ways language work may be closely correlated with nature-study work, and each is impossible without the other. Choice poems, readings and stories, all breathing the spirit of Nature, and referring to the topics studied, should be read or recited occasionally. The literature of Nature is extensive and valuable, and should play an important part in the general education of the child.

NATURE-STUDY AND ART.

Flowers, buds and insects are so rich in form and color that they appeal to the artistic sense in every child. The objects of Nature may be used in drawing or painting lessons. The material for lessons in both subjects may be secured at the same time. In the primary grades, in particular, the art work should be based mainly on what the children can see. The landscape at different seasons and in different lights, the grass, the trees, the clouds, and bodies of water are excellent subjects for color work. The fruits, leaves, vegetables, flowers, and many animal forms may be drawn in pencil or crayon. Art work and nature-study work are inseparable. To study the things of Nature is to admire and love the harmony and beauties of color and form in Nature, and to wish to express those feelings by pencil, pen or brush.

NATURE-STUDY AND GEOGRAPHY.

Life depends upon its environment. In studying animals and plants the natural surroundings of those living things will be considered. This leads to the study of the brook, the hills, the rocks, the soil, the sun, the weather, and many other things of Nature. This is also geography for the child, because geography as a subject should begin with the study of the natural environment of the child at home and in the community. Nature-study and geography are naturally closely related subjects.

NATURE-STUDY AND HISTORY.

At first thought history as a subject seems far removed from nature-study. The study of weeds, cultivated plants, and domestic animals, however, brings up the story of our colonial days. Many of our plants and animals have been introduced from Europe. The study of stars and insects brings to mind the bible stories relating to these objects. The study of our plants and animals is not complete without references to the part many of them played in the lives of the Indians in days gone by. Thus history and nature-study can be correlated to advantage.

NATURE-STUDY AND ARITHMETIC.

Every course in nature-study and agriculture suggests many arithmetical problems based on topics studied. In years past questions in arithmetic have been chiefly theoretical. The arithmetic of the future must be intimately linked with the every-day life and occupations of the people. Nearly every lesson in nature-study affords an opportunity for arithmetical questions. In arithmetic classes many questions bearing on nature-study work should be given, and the subjects closely correlated. Success in the correlation of any two subjects depends, of course, on the genius of the teacher.

NATURE-STUDY AND AGRICULTURE.

There is no dividing line between nature-study and agriculture. Both are based on the study of life and the natural conditions that encourage or limit life. The most successful agriculturist must begin as a child with a study of the things and processes of Nature and he must conclude with the same study. Children have little thought of the pocket-book, and study Nature because they are naturally interested in and love her—we call this study Nature-Study. Older children and adults think of the financial profits to be obtained from a study of Nature—we call this study Agriculture. Nature-study is agriculture for young children, and agriculture is nature-study for older children. One subject merges imperceptibly into the other. For the primary and elementary grades we call it Nature-Study; for the upper grades we call it Agriculture.

NATURE-STUDY MATERIALS.

One of the chief objects of Nature-Study is to cultivate the habit and power of observation; and in the lower grades, in particular, much use should be made of objects that the children can actually observe. Live creatures are much more interesting than dead ones, or pictures; and when possible pet birds, squirrels, rabbits, fishes or other animals should be kept for short periods in the schoolroom. Live insects, toads, frogs, turtles and other small animals are easily kept in boxes or cages with earth bottoms. The development of tadpoles, the transformation of caterpillars into winged insects, the hibernation of toads, and other natural phenomena are readily observed. Every room should have its potted plants and boxes of flowers in the windows during spring and autumn months. Pictures are poor subjects for nature-study lessons; but good pictures, particularly of birds and animals, can be used with good results in illustrating a lesson. Diagrams and blackboard sketches simplify descriptions and give a clearer idea than a word description. When possible simple experiments should be carried on. They are always interesting, give useful information, and for older pupils afford excellent practice in inductive reasoning The ideal nature-study lesson is one given out-of-doors in direct contact with the subject of the lesson. Occasional walks or excursions should be arranged for in order to study Nature under her most natural conditions. To make the field lessons a success, however, the teacher must have some acquaintance with the things of Nature, and must have a definite object in view for each trip.

NATURE RECORDS.

By means of bird, flower and weather records or calendars much can be done, in an informal way, in all grades, to encourage observation of natural phenomena. For primary classes records in simple form may be kept on the blackboard. In the upper grades note-books may be used. There should be one record for the room, or each of the upper classes, containing the observations of the class. This should be suitably decorated by a pupil selected by the class. A Spring Nature Calendar containing observations on birds, flowers and other things, and a Weather Record for at least one month of each term should be kept in every school and preserved or future reference. The following forms, for use by older children, are recommended:

1915——SPRING NATURE CALENDAR——1915.

(Name of School).

Date.	Observation.	Description.	Observer.
April 1 ..	Robin.....	Reddish-brown breast; dark above; cheery notes.....	John White.
May 1....	White Trillium..	Three white petals, enclosed by three green sepals.....	Clara Brown.

OCTOBER——WEATHER RECORD——1915.

Date 8.30a.m.	Temp.	Force of Wind.	Direction of Wind.	Rain or Snow.	Appearance of Sky.	Remarks.
Oct. 1...	50°	Light.	West.	.....	Clear.	Very fine day.

THE COURSE IN NATURE-STUDY AND AGRICULTURE.

This course in Nature-Study and Elementary Agriculture is an attempt to arrange a series of lessons suitable to the age and experiences of the children, and to the month of the year in which the lessons are given. Because of such wealth of material the problem is as much one of elimination as one of selection of material. In planning this course the natural interests of the child in his home and environment, and in the upper grades the agricultural interests of the community are kept in mind. The course is arranged primarily for rural schools, but there are few lessons suggested which are not also suitable for town or city schools. The teacher should give particular attention to certain topics according to local requirements. The close correlation of Nature-Study and Elementary Agriculture with the other subjects of the school course is necessary for the best results in all subjects. In nearly all rural schools, where one teacher only is employed, classes may be united for these lessons. The work of one grade could be taken one year and the work of another grade the next year. The subject

of the lesson is not so important as the lesson itself. Whenever possible material for object lessons and illustrative purposes should be obtained by teacher and pupils. The lessons selected for this course are those that can be illustrated by material or apparatus quite readily made or obtained by teacher or pupils, and with little expenditure of energy or money. Lessons requiring much or expensive apparatus are omitted. An alcohol lamp, a few test-tubes, some glass and rubber tubing, and a little alcohol can be obtained at the nearest drug store for one dollar or less. The Mumford colored pictures of birds, animals, insects, trees and other objects, costing about two cents each unmounted, are sold by the Dominion Book Company, Toronto, and by several picture firms in the United States. For nature-study lessons the teacher **must plan and provide** if they are to be successfully taught.

Talking or reading about the things of Nature is of little value as nature-study work. Actual contact, in the spirit of interest, sympathy and love, with the things of Nature, is true Nature-Study. There will be no lack of interest on the part of the pupil if the teacher is interested. When the teacher has very little knowledge concerning the objects and phenomena of Nature, and has less interest and desire to learn, her attitude will soon put a damper on the greatest natural interest shown by any pupil. In nature-study, more strikingly than in other subjects, the attitude of the teacher toward the subject determines very largely the success or failure of the teaching of that subject in the school. In teaching nature-study the teacher cannot rely, as she does in many subjects, on opening a book and keeping ahead of the answers of the pupils. Nature-study cannot be studied successfully from books—the actual objects and phenomena of Nature must be observed. Books can be of great service, however, to the teacher in particular, in suggesting methods of presentation and in giving information which beginners could not otherwise readily obtain. To quote from Prof. L. H. Bailey: "Surely one ought to know the common plants and birds, though he cannot be expected to know **all** the plants and birds any more than all the facts in the books; but he ought to have the power and the desire to know them and, what is more to the point, he ought to have the educational benefits of studying such things in their life relations. It were better that we know the things, great and small, which make up our natural environment, and that we live with them in harmony, for all things are of kin; then shall we love and be content. One's happiness depends less on what he knows than on what he feels."

GRADE I.—SEPTEMBER.

Lesson 1. Wild and Garden Flowers. Have the children bring flowers such as pansies, nasturtiums, buttercups, dandelions, and clovers, to school. Count the flowers and notice the color, shape, and odor of each. Talk to the children about where each kind grows, how long it lives, its beauty and its usefulness. Let the children make the flowers into bouquets and keep them in water.

Lesson 2. Tree Leaves. Let the children bring leaves from different trees, as maple, birch, elm, apple. Count and draw the leaves, using colored crayons. Have the children notice the shapes, and colors. Give them practise in picking out the different kinds of leaves from a collection.

Lesson 3. How Seeds are Carried. Gather the tufted seeds of dandelions, thistles, and milkweed. Gather burs from burdock, and seeds from beggar-ticks. Have the children tell how they are carried to new places. Notice how the tufted ones float in the air.

Lesson 4. Children's Pets. Talk to the children about how they should care for their pets. Develop the kindly feeling of children towards animals. Let children relate incidents connected with their pets.

Lesson 5. Some Wild Animals. Show pictures of rabbits and squirrels. Tell stories about them. Discuss their habits, where the little creatures live, and what they eat.

Lesson 6. The Seasons. Teach the names of the seasons and of the three months in the autumn season. What are the chief features of the autumn season?

Lesson 7. How Plants Prepare for Winter. Have the children bring colored leaves and ripe apples to school. Talk about the coloring of the leaves and the ripening of fruits as a preparation for winter.

Lesson 8. Weather Changes. Discuss the weather changes such as shorter days and cooler nights. Notice the change in the position of the sun by marking the position of the sunlight on the floor at a certain hour, and at the same hour after one week.

General. Read stories about animals and flowers. Encourage the children to bring and keep bouquets of fresh flowers in the room. Collect and mount colored leaves in scribblers. Where a pet can be properly cared for keep one in the school-room.

GRADE 1.—OCTOBER.

Lesson 1. Study of a Buttercup. Observe the complete plant. Learn the names of the different parts—roots, stem, leaves, flowers and fruits. Draw the plant.

Lesson 2. Common Fruits. Bring common fruits, such as apples and plums. Notice size, color, taste and shape. Draw them, using colored crayons.

Lesson 3. Study of a Pumpkin or Squash. Study one of these and then cut so as to make a jack-o-lantern. Draw it before and after cutting. Observe the seeds it contains and try to count them.

Lesson 4. Coloring and Falling of Leaves. Continue the study of leaves, noticing in particular the different colors. Draw and color them and compare with previous drawings. By talks, develop the idea that by coloring and dropping their leaves, the trees are preparing for winter.

Lesson 5. A Visit to the Woods. If possible visit the woods, or have talks about what may be found, seen, or heard there, and how different it will be when winter comes. Notice trees and their leaves, and the different animals.

Lesson 6. Common Animals and Their Preparations for Winter. Discuss, from information gathered in the previous lesson, how the different common animals such as birds, rabbits, squirrels, fish, insects and toads move about. Are the animals that live in the woods making any preparations for winter and what are they?

Lesson 7. How People Prepare for Winter. Discuss the preparations for winter that the people at home are making, such as harvesting, threshing, gathering fruit, digging potatoes, and plowing.

Lesson 8. The Weather and its Effects. Observe and have talks about the weather, the cold rains, shorter days, cold nights, white frost, strong winds. Notice the effects of colder weather on the landscape, the flowers, and the birds.

General. Read or tell stories about the fading of the flowers, the falling of the leaves, and about Thanksgiving Day.

GRADE 1.—NOVEMBER.

Lesson 1. Common Vegetables. Bring specimens of common vegetables as carrots, parsnips, beets and turnips. Compare them as to size, shape, color, and rootlets. Make a drawing of each.

Lesson 2. Uses of Vegetables. Cut a slice from each vegetable studied in previous lesson and taste it. Notice the color, odor, taste and hardness of the flesh. Discuss the uses of these fleshy roots to the plant and to animals. How are they kept during the winter?

Lesson 3. The Trees in Autumn. Compare twigs from evergreen trees and leafless trees. Develop the thought that trees with broad leaves drop their leaves and those with very small leaves do not. Make a drawing of the two twigs. Examine the buds and discuss their use.

Lesson 4. The Birds in Autumn. Discuss the disappearance of the birds, where they go, and why they leave us. Name some that remain. What do these find to eat during the winter? Advise the feeding of birds in winter.

Lesson 5. The Insects in Autumn. Discuss the disappearance of insects, such as flies, bees, butterflies, and moths. What has become of them and how will they pass the winter? Show specimens of insect eggs, cocoons, and pupa-cases to illustrate the different forms in which insects pass the winter.

Lesson 6. Squirrels. From observations and from pictures, describe the striped squirrel or chipmunk, and the red squirrel. Discuss the gathering and storing away of nuts by squirrels. How does each squirrel spend the winter? Which provides better for winter?

Lesson 7. Bears. From pictures describe the common bear. Discuss its food and its preparation for winter. Where and how does it spend the winter? What other animals sleep during the greater part of the winter?

Lesson 8. How People Prepare for Winter. Have talks about the coming cold weather and how to prepare for it by storing away food for ourselves and our domestic animals, by storing away fuel to burn, by putting on warmer clothing, and by making our houses warmer.

General. Observe the frost on the grass and stones, and the ice forming in the streams. Read and tell stories about the preparation for winter made by different animals, and by the people of other countries.

GRADE 1.—DECEMBER.

Lesson 1. Evergreen Trees. Observation of branches from evergreen trees such as pines, spruces, or fir. Compare the twigs with those from trees like the maples and birches. Why are pines, spruces, fir and others called "evergreens"?

Lesson 2. The Leaves of Evergreen Trees. Count and measure the length of the leaves of different kinds, and notice color, shape, stiffness and arrangement. Draw them. Distinguish between leaves of pines, spruces, and fir.

Lesson 3. The Frost. Observe the frost pictures on the window, and the crystals of different shapes in fresh snow. Draw or cut out from paper the different shapes.

Lesson 4. Winter Birds. Observations and talks about birds that spend Christmas with us, particularly the English sparrow, what it gets to eat, how it keeps from freezing and where it stays at night. Encourage children to feed birds.

Lesson 5. Domestic Animals during Winter. Talks about the preparation for winter made by our domestic animals, such as hens, cows, horses, sheep, dogs and cats, and how we should care for them by providing warm houses and plenty of food.

Lesson 6. The Cat. Special study of the cat, its covering, eyes, teeth, claws, and number of toes. Have children observe these points at home and report. Use pictures.

Lesson 7. The Reindeer. Talks and observations from pictures about reindeer, where they live, and their association with the coming of Santa Claus.

Lesson 8. A Christmas Tree. Bring in a small tree, observe its shape, arrangement of branches, height, width and color of leaves and bark. Draw it and begin to decorate it for Christmas closing. Notice the effect of heat on the leaves and compare it with one kept out-of-doors.

General. Read or tell stories of winter weather, Santa Claus and his reindeer, and of Christmas in other lands.

GRADE 1.—JANUARY.

Lesson 1. The Protection of Plants in Winter. Talks on the protection of plants and their winter sleep. Discuss differences in summer and winter. Compare deciduous and evergreen trees in winter time.

Lesson 2. The Bark and Wood of Trees. Examine specimens showing both wood and bark. Distinguish between the bark and the wood. Discuss the use of the bark as a protection for the wood. Compare the bark with the skins of animals.

Lesson 3. The Sheep. If possible, observe a sheep, or use pictures and specimens of wool. Study the sheep chiefly as regards its covering, food, and habits.

Lesson 4. Wool and Its Uses. Illustrate the lesson by specimens of wool on hide, shorn wool, and spun and woven wool. Discuss the making of yarn and cloth from the wool of the sheep.

Lesson 5. Fur-Bearing Animals. Examine the fur garments of the children and discuss the trapping and hunting of fur-animals. Refer to the use of furs by Indians. What wild fur-bearing animals live in the Province?

Lesson 6. Domestic Animals. How They are Covered. Discuss the covering of our domestic animals and their protection and care during the winter. What is their food and what calls do they make? Name those covered by hair, by feathers, by bristles, by wool.

Lesson 7. Winter Birds. Continue observations of the habits of winter birds. Entice them about the homes and school-house by feeding them. Discuss the names, colors, and habits of those seen about during winter. What do they find to eat?

Lesson 8. The Sun. Easy lessons on the sun, its shape, color, uses, and where it rises and sets. Teach the meaning of the terms left, right, up, down, under, above, near, far.

General. Read or tell stories about winter in other countries, and the habits of our wild animals during winter.

GRADE 1.—FEBRUARY.

Lesson 1. The Trees in Winter. Divide the trees into two groups, those with leaves called evergreens, and those without leaves. Mention some examples of each group. What has become of the leaves that fell? Make a drawing of a tree without leaves.

Lesson 2. Birds' Nests. Follow up the discussion of the appearance of trees in winter by encouraging the pupils to look for birds' nests. Bring a nest to school and observe its size, shape, what it is made of, and how the materials are used. If possible study a robin's nest in this way. Does the robin use the same nest each year?

Lesson 3. The Landscape in Winter. Discuss the general appearance of the landscape in winter, the white fields, the great drifts of snow, the beauty of the evergreens loaded with snow, and other winter features. Make a picture of a winter landscape.

Lesson 4. Footprints in the Snow. From observations and by the use of drawings on the board, discuss the size, depth, shape, and general appearance of the footprints of animals in the snow. Distinguish those made by rabbits, birds, cows, dogs, cats, and horses.

Lesson 5. The Cow. From reports of pupils and from pictures describe the general appearance, size, covering, color, feet, food and habits of the cow. What does the cow give us and what is made from it?

Lesson 6. The Rabbit. From observations and pictures discuss the size, covering, color, feet, food and habits of rabbits. Learn to distinguish the footprints in the snow.

Lesson 7. Winter Storms. Have talks about snowstorms, snowflakes, snowdrifts, crust, and ice, and the relation of each to sliding, skating, and other winter sports.

Lesson 8. Winter Clothing. Discuss the requirements as regards clothing during cold and stormy winter weather. What substances are used in making winter clothing? How should coats, caps, mittens, and other articles of clothing be cared for when not in use?

General. Talks and stories about Eskimos, their life, food, and homes. Watch for appearance of crows or other birds in February.

GRADE 1.—MARCH.

Lesson 1. Sap. What is it? How obtained? Cut off twigs from maple trees and watch for sap. When sap is obtained, taste it and discuss its contents.

Lesson 2. The Use of Sap. Talks and stories by the children of their trips to sugar-camps and the making of syrup, candy and sugar. If possible, boil some sap and make candy.

Lesson 3. Signs of Awakening Spring. (1) Mother earth. Have talks about the longer and warmer days, the rains, the melting snow and the appearance of the bare ground.

Lesson 4. Signs of Awakening Spring. (2) Birds. Watch for returning birds and learn to name the crow, robin, and blackbird. By use of pictures discuss these birds, their colors, size, songs and habits. Encourage children to report their observations of birds.

Lesson 5. Signs of Awakening Spring. (3) Animals. Read and tell stories of the spring awakening from their winter sleep of bears, groundhogs and other wild animals.

Lesson 6. Signs of Awakening Spring. (4) Insects. Look for cocoons of insects, and the eggs of the tent-caterpillar on apple twigs. Bring them to school and observe any changes. Talks about the winter life of flies and mosquitoes. What insects are about now?

Lesson 7. The Seasons and Months. Review the names of the four seasons and have talks about each, what it brings and the enjoyments of each. Teach the names of the twelve months.

Lesson 8. The Earth's Surface. Teach the terms "hill," "hollow," "slope," and "level." Which loses its snow first and why?

General. Read and tell stories about birds. Report the arrival of crows, blackbirds, robins, and sparrows. Keep a bird calendar on the blackboard, e.g. John saw a crow.

GRADE 1.—APRIL.

Lesson 1. Signs of Spring. Bring twigs of willows, lilac, poplars, and maples. Place them in water and observe from day to day the swelling and opening of the buds. Discuss signs of spring, as appearance of "pussies" on willows, the green grass, and the return of the birds.

Lesson 2. A Bean Seed. Observe shape, colors, and marks on bean seeds. Draw one. Compare with those which had been soaked in water for a day or more. Discuss the differences in appearance between soaked and unsoaked beans. Remove coat and look for the little plant within and the store-houses of food.

Lesson 3. A Window Garden. Plant bean and pea seeds in damp sawdust behind glass. Observe the growth from day to day. Also plant nasturtium and radish seeds in pots of earth and place them in the window. Discuss the planting of the seeds.

Lesson 4. The Robin. From the reports of the children and from pictures discuss the size, colors, song, and habits of the robin. What does it use in building its nest? Describe the nest and eggs.

Lesson 5. The Song Sparrow. From a picture describe the size, colors, and other features of the song sparrow. Describe its song and point out that it is the first of the song birds to return.

Lesson 6. The Crow Blackbird. From reports of the children and from pictures, describe the size, colors, notes, manner of walking, and the general habits of the blackbird. Why is it called the crow blackbird? Where do blackbirds build their nests? Look for blackbirds with red and cream colors on the wings.

Lesson 7. The Insects in Spring. Encourage children to watch for insects and report the first appearance of flies, mosquitoes, bumblebees, butterflies and spiders. A talk about some of these and their habits.

Lesson 8. Young Animals. Discussion of reports by the children of their observations of lambs, calves and colts, their appearance, frolics, and how cared for by their mothers.

General. Discuss the weather changes from day to day. Keep a weather calendar in simple form. Read and tell stories of young animals.

GRADE 1.—MAY.

Lesson 1. Spring Flowers. Bring trilliums, dandelions, pansies, and other spring flowers to school. Notice colors, shapes, perfume and beauty of flowers. Make bouquets and keep the flowers in water.

Lesson 2. The Different Parts of a Flower. Distinguish the different parts of a trillium flower, by the color, size, and shape of the parts. Count the circles or groups. How many parts in each circle? Draw the separate parts, using colored crayons.

Lesson 3. Some Common Seeds. Observe the shape, size, and color of some common garden seeds, as beet, parsnip, carrot, bean, pea, and nasturtium. Learn the name of each kind. Count the number of each kind. Mix them and then sort out the different kinds.

Lesson 4. A Little Garden. Fill a few pots or cans partly full of good soil. Let the pupils plant seeds of lettuce, radish, nasturtium or other seeds. Discuss the planting and care of these window-gardens.

Lesson 5. Maple Leaves. Bring twigs of maple trees. Observe the color, softness, and wrinkled appearance of the new leaves. How was each leaf folded in the bud? What protected it during the winter? Draw and color a leaf.

Lesson 6. Evergreen Leaves. Bring twigs from pine, spruce, or other evergreen trees. Compare the leaves with maple leaves as to size, shape, and color. Why are pines, spruces, and other trees called "evergreens"? What signs of life are evergreens showing?

Lesson 7. Toads and Frogs. If possible, capture a toad or frog and keep it in a vessel of water, with stones at the bottom. Feed it flies or pieces of meat. Discuss the piping of toads and the croaking of frogs. Where do toads and frogs live in early spring? Encourage children to look in ditches for the jelly-like egg-masses of toads and frogs.

Lesson 8. Birds' Nests. Examine one or two old nests. What is used in making them? Discuss the building of nests by birds. Where does the robin place her nest? What does she use in building it?

General. Watch for the appearance of new flowers and birds. Bring flowers to school and make bouquets. Observe caterpillars on leaves. Bring them to school and observe them eating the leaves. Listen to the piping of toads and the croaking of frogs and learn to distinguish between them. Watch the birds at work building nests. Read and tell stories of bird and insect life.

GRADE 1.—JUNE.

Lesson 1. Common Leaves. Bring common leaves to school. Count them. Draw a maple leaf and a buttercup leaf, using colored crayons. Distinguish between maple, elm, and ash leaves.

Lesson 2. What Plants Like. Observe the plants in the window. Why do leaves turn toward the light? Why do we water plants? Why are house plants not left in cold rooms? Develop the thought that plants like water, sunlight, and warmth

Lesson 3. Busy Workers. If convenient visit a bee-hive and observe bees at work. Observe bees visiting flowers. Talks about bees, the queen, the busy workers and what they do, and the lazy drones.

Lesson 4. A Hen and her Chickens. Discuss the observations of the pupils at home on the colors and covering of chickens, their food, how the mother-hen calls and cares for them, and what they do when sleepy. Why and how do chickens scratch?

Lesson 5. Mosquitoes. Place some in bottles and observe them. Notice their legs, wings, and feelers. Talks about how they bite, why they bite, and what harm they do.

Lesson 6. House Flies. Catch several and place them in bottles. Observe their legs and foot-pads, wings and eyes. Talks about flies, what they eat, what harm they do, and how they passed the winter.

Lesson 7. The Brook. Talks about a visit to a brook, the swiftness of the water, where the water goes, where the brook gets its water, how the water carries things along, and the use of the brook.

Lesson 8. June Colors. Talks about the beauty of the landscape in June. What colors are most common? What is the most common color? Represent a landscape scene in colors.

General. Continue observations and report on birds. Make bouquets of different flowers. At the sand-table make hills, brooks, and toy-boats to float on the water of the brooks. Read and tell stories about the coming vacation and its enjoyments.

GRADE 2.—SEPTEMBER.

Lesson 1. Garden Weeds. From a garden bring plants not wanted there. Learn the names of a few, for example, shepherd's purse, red-root pigweed, dandelion, Canada thistle. Why are these plants called weeds? Why are they not wanted in the garden?

Lesson 2. Garden Flowers. From a garden bring specimens of different flowers. Notice the different colors and shapes of the flowers. Learn the names of a few common ones, for example, pansy, candytuft, mignonette. Why are these plants wanted in the garden?

Lesson 3. How Seeds are Carried. Gather goldenrods, asters, and daisies. Count the seeds. Why are these plants so abundant? Look for devices for carrying the seeds. How are dandelion and thistle seeds carried? How are burdock fruits carried? What animals carry edible fruits and drop the seeds?

Lesson 4. Fruits. Bring different kinds of wild and cultivated berries and other fruits. Learn the names of the different colors. Taste them and distinguish the tastes sour, sweet, bitter and stinging. Make drawings in colors of the fruits.

Lesson 5. Autumn Leaves. Collect leaves. Sort out those of the same kind and arrange the leaves in groups. Distinguish maple, elm, apple and birch leaves. Draw a rock maple leaf.

Lesson 6. What the Birds are Doing in September. Have pupils report their observations and discuss the habits of birds in late summer. What do the birds find to eat? Are fruits eaten, and by what birds? Why do the birds gather in flocks? Why do they chatter so loudly?

Lesson 7. Some Common Insects. Bring specimens of caterpillars, grasshoppers, and crickets to school and place them in bottles on earth and green leaves. Observe their habits. Which eat leaves? Which make sounds? How many legs has each kind? What will they do when cold weather comes?

Lesson 8. The "Harvest" Moon. A talk on the "harvest" moon, its shape, size, color, use, and where and when it rises and sets. Why is it called the "harvest" moon? Make a drawing of it in colors.

General. In the school or home garden observe the effects of weeds, insects, and lack of water. Distinguish between weeds and good plants. Pull the weeds. Make bouquets of flowers. Read and tell stories about the migration of the birds, and the lives of the flowers.

GRADE 2.—OCTOBER.

Lesson 1. Common Vegetables. Gather the vegetables and seeds from the garden, put the seeds in packages and clean the garden plot. Study the common vegetables, noticing the shape, size, color, and taste. Draw them and learn their names.

Lesson 2. Effects of Frost on Plants. Observe the effects of frost on plants and notice that some are more tender than others. What will become of the tender plants? How have they provided for another year?

Lesson 3. Study of the Apple. Bring apples to school and study them, the beautiful colors, the smell, taste, hardness, and number of seeds. Make colored drawings from apples.

Lesson 4. Autumn Leaves. Continue the collection and observation of leaves. Notice the typical colors of red maple, elm, and sumach. Discuss the coloring and falling of the leaves.

Lesson 5. Tree Twigs. Examine tree twigs and observe the leaf-scars and the buds just above the scars. What made the scars? What do the buds contain? Draw a twig.

Lesson 6. Study of Nuts. Gather nuts. How many kinds can be found? Crack them and taste the meat, distinguishing between those good to eat, and those that are not.

Lesson 7. The Duck. From pictures, and home observations, compare a duck with a hen as to size, bill, feet, feathers, colors, and general habits. How are ducks distinguished from hens? What features are common to both?

Lesson 8. The Goose. From pictures, and observations at home, compare a goose with a hen as to shapes of bills, and feet, swimming, walking, flying, feeding, and covering. What animals have web feet, combs, scales, fins, feathers, claws, horns, or hoofs?

General. Weather observations, and talks about the shorter days, cold nights, and their effect on plants and animals.

GRADE 2.—NOVEMBER.

Lesson 1. Native Nuts. Collect different kinds of native nuts, such as hazel, chestnut, hickory, etc. Observe them as to shape, covering, shell and taste of meat. Which are edible?

Lesson 2. Foreign Nuts. Compare native nuts with nuts bought at stores. Discuss uses of nuts to the trees, to wild animals, and to people. Name those that are for sale at stores.

Lesson 3. Fruit Protection. Discuss how fruits protect themselves from animals as illustrated by the bur of the chestnut, the bitter covering of the butternut and hickory, the prickly husk of the beech and horse chestnut. Why does Nature protect the nuts?

Lesson 4. Storage of Fruits. Wild animals, such as squirrels, gather and store nuts for winter. Compare their stores with the store man gathers for the winter.

Lesson 5. Animal Shelters. Describe the homes of the beaver, groundhog and bear. Compare these with those built by man for domestic animals. Why are shelters necessary for most animals in winter?

Lesson 6. Materials used for Shelters. Discuss materials used in the making of different kinds of animal shelters. What do mice, bears, beavers, groundhogs, rabbits and foxes use in making their homes?

Lesson 7. Building Materials. Obtain specimens of wood, brick, stone and clay. Compare them and discuss the merits of each for building purposes. Which are used in building our houses? Do wild animals use any of these?

Lesson 8. What the Weather Does. Talks on weather in relation to changes in covering or clothing of animals. What changes do we make as regards color, kind, thickness and warmth of clothing? What changes do wild animals make?

General. Read or tell stories about the preparation of plants and animals for winter. Notice weather conditions and keep a record. Compare with observations in October.

GRADE 2.—DECEMBER.

Lesson 1. Evergreen Trees. Bring some cones of evergreens to school and observe the effect of warmth in opening the scales and scattering the little winged seeds. Read from Hiawatha about the use of evergreen trees by the Indians. Why are these trees called "evergreens"? Name some. Set up a small evergreen tree. Have the pupils make gifts and decorate the tree for the Christmas closing.

Lesson 2. Fruits. Compare cones with fruits of trees from warm countries,—the orange, banana, and cocoanut. Look for seeds in each fruit examined. Make colored drawings of the fruits.

Lesson 3. The Rabbit. Its covering, habits, tracks in snow, food and use. Compare with the cat as to covering, habits, food and movements. Look for rabbit tracks in snow. Use pictures and skins

Lesson 4. The Deer. Study from pictures of the deer, its appearance, covering, habits, food and home. Compare with the reindeer of the north, leading up to the use of it by Santa Claus.

Lesson 5. Birds. Observation of winter birds, number of kinds, food, habits, and shelter. Distinguish English sparrow, pigeons, and woodpeckers. Discuss their food, habits and homes.

Lesson 6. Use of Thermometer. Show the pupils a thermometer. Breathe on the bulb and watch the mercury rise. Compare height of mercury when indoors with height when outdoors. Discussion of the use of the thermometer.

Lesson 7. Weather Conditions. The short winter days, the cold nights, the snow, the frozen rivers and ponds, with discussions of conditions for the coming of Santa Claus.

Lesson 8. A Trip with Santa Claus. Discuss an imaginary trip from the North Pole with Santa Claus. How would you travel? What would you see? What would you get to eat? How would you keep warm?

General. Read and tell stories about Santa Claus and Christmas in this and other lands.

GRADE 2.—JANUARY.

Lesson 1. The Trees in Winter. Examine twigs from maple, elm, fir, and spruce trees. Divide these or other twigs into two groups. Look for buds on the twigs. What do the buds contain? Discuss the general appearance of trees in winter.

Lesson 2. The Balsam Fir. Examine twigs of Balsam Fir. Notice the leaves, bark, and cones. Notice the odor, and the resinous covering of the leaves and young bark. Compare the bark on a twig with that from the trunk. Discuss the use of the tree for decoration indoors, for making pillows and beds for hunters, and as a source of Canada balsam.

Lesson 3. The Birds in Winter. Continue observation of the birds and look for new arrivals from the north as snow bunting (snowbird) and the pine grosbeak. Discuss the colors, food and habits of these two birds.

Lesson 4. The Insects in Winter. Look for cocoons and pupa-cases outdoors, and for flies and spiders indoors. Discuss the winter life of insects, particularly of flies and spiders.

Lesson 5. Winter Life in the Country. Compare winter life in the country with life in the city. What are the chief occupations of men in the country during the winter? What things do they use in their work?

Lesson 6. The Dog. Discuss the form, covering, paws, strength, habits, and food of dogs. Read or tell stories of St. Bernard and other famous dogs. Compare the dog with the cat as to covering, food, and habits. Which is more intelligent and more faithful?

Lesson 7. The Fox. By use of pictures, discuss the form, covering, colors, habits, and food of foxes Compare foxes with dogs, and bring out the idea of relationship.

Lesson 8. The Big Dipper. Draw on the board a picture of the Big Dipper and the North Star. Count the stars in the dipper and teach the location of the North Star. Encourage children to locate these in the sky in early evening.

General. Read and tell stories about the winter life of Indians and of peoples in other lands.

GRADE 2.—FEBRUARY.

Lesson 1. A Piece of Wood. Examine a specimen of wood showing the bark. Observe the color, thickness, hardness, and nature of both wood and bark and compare them. Look for the different layers in each and explain that a new layer is made each year.

Lesson 2. Lumbering. Tell the story of lumbering, using pictures, and specimens of boards. Discuss the cutting of the trees, how they are dragged to the stream, floated down the stream in spring, and sawed into boards. What objects in the room are made from wood?

Lesson 3. The Partridge. From pictures describe the form, colors, size, covering and bill of a partridge. Discuss its food, habits and life during winter.

Lesson 4. The Hen. From observations of pupils and from pictures describe the size, colors, covering, bill and feet of hens. Compare hens with partridges as to use, habits, food and winter life.

Lesson 5. Wool. Examine specimens of wool, yarn, and cloth, and discuss the different stages in making cloth as shearing, carding, spinning, and weaving. Distinguish between knitting and weaving.

Lesson 6. Our Winter Clothing. What articles of clothing worn in winter are made from wool? What other substances are used in making winter clothing? Why is cotton clothing worn in summer and woollen clothing in winter?

Lesson 7. Snow-Storms. Observation and discussion of weather conditions indicating an approaching snow-storm, the clouds, direction of wind, temperature and appearance of the sun. Of what use or harm are snow-storms?

Lesson 8. Snowflakes. Watch for falling snowflakes and examine some. Notice the little crystals. Try to draw one. Fill a cup with snow, melt the snow, and observe the amount of water obtained. Of what are snow-flakes made?

General. Read and tell stories of winter life in the different parts of Canada. What fruits eaten in winter are grown in Canada? Where do oranges and bananas grow?

GRADE 2.—MARCH.

Lesson 1. Tree Twigs. Bring twigs of poplars, willows, and maples. Compare them as to color of bark, and buds. Sketch them. Place the twigs in water and observe the swelling of the buds from day to day. Which twigs have catkins?

Lesson 2. The Maple Tree. Study the maple twig. Distinguish between maple twigs and twigs of willow and poplar. Of what use are maple trees? Discuss the making of fuel from the wood, and of syrup, candy, and sugar from the sap. Read stories and poems about the maple tree in Canada.

Lesson 3. Germination of Seeds. Examine bean and pea seeds. Notice the scar where the seed was attached to the pod. Look at seeds still in the pod. Examine seeds soaked in water for a day and observe the skin, seed-leaves and the little green plant therein.

Lesson 4. The Crow. Report the first crow. From observations and pictures describe the crow as to size, color, beak, food and habits. What does it make?

Lesson 5. The Robin. Report the first robin. What are the distinguishing features of the robin? Compare it with a crow as to size, colors, song, food and habits. Why is the robin liked by most people?

Lesson 6. The Song Sparrow. From pictures and observations describe the song sparrow as to size, colors, song, food and habits. Try to imitate its song. Why is the song sparrow liked by all?

Lesson 7. Wild Geese. Look and listen for the notes of wild geese flying northward. From pictures describe them. Make a drawing on the board showing how they fly. Discuss their life and habits.

Lesson 8. The Work of the Sun. Put some water in a dish and expose it to the sun for a few days. What has become of the water? What caused it to disappear? What becomes of it? Discuss the work of the sun in melting the snow, and making streams and ponds of water.

General. Report the first appearance of flies and other insects. Notice the lengthening of the days, the melting of the snow and ice, and the work of running water. Keep a record in simple form of the return of the birds.

GRADE 2.—APRIL.

Lesson 1. A Window-Garden. Plant bean, pea, corn or squash seeds behind glass in any glass dish containing damp sawdust; or place the seeds between folds of damp blotting-paper. Observe the growth from day to day. Plant some seeds in cans or pots of earth and place them in the windows. Water regularly and observe the plants grow.

Lesson 2. Maple Sap. Cut off some twigs from a maple tree and observe the flow of the sap. Discuss the uses of sap to the tree and to people. Tell the story of a visit to a sugar-camp, and the fun of "sugaring-off."

Lesson 3. Young Animals. Talk about the young animals at home, the colts, lambs, calves, and chickens. What are the habits and food of each?

Lesson 4. Toads and Frogs. Report the first croaking of frogs or piping of toads. Learn to distinguish between the two sounds. Discuss the life, food, and habits of toads and frogs. Look for their jelly-like masses of eggs in ditches. Keep the eggs in water and observe the appearance and development of the tadpoles.

Lesson 5. The Birds in April. Report the appearance of new birds. Distinguish between the song sparrow and the chipping sparrow as to size, colors, songs, and habits. Keep, in simple form, a record of the return of the birds

Lesson 6. The Flowers in April. Report the first flowers in blossom. Bring them to school and observe their colors, perfume, and shapes. Make a special study of willow "pussies" and draw them.

Lesson 7. The Work of Water. Observations and talks on the work of running water, on hillsides, ditches and level ground. Lead up to the meaning of the terms stream, river, pond, island, and bay. If possible, represent these at the sand-table or in flat pans filled with sand.

Lesson 8. "April Showers Bring May Flowers." By questions lead up to the meaning of the term "shower." What other terms are applied to rain? How can April showers help in bringing May flowers?

General. Watch for the first flowers, earthworms, bumblebees, butterflies and flies. Report the birds and keep a bird calendar in simple form.

GRADE 2.—MAY.

Lesson 1. Garden Seeds. Study seeds of common garden plants, e.g. radish, lettuce, carrot, parsnip, cucumber, and nasturtium, observing the shape, color, smoothness and size of the seed. Practise selecting and naming each kind from a mixture of all.

Lesson 2. How to Make a Garden. Discuss the making of a garden, how to make the soil ready, what to plant, how to plant, and the care of the garden.

Lesson 3. The Flowers in May. Make bouquets of the wild flowers. Observe the colors, shapes, and perfume of those collected, and distinguish and learn the names of the dandelion, violets, dog's-tooth violet, and buttercup.

Lesson 4. The Trees in May. Compare the flowers of maple trees with those of the elm. Distinguish between maple twigs and elm twigs. On what trees do flowers appear before the leaves? Are there any trees that do not bear flowers?

Lesson 5. "Fiddleheads." Bring to school and observe some young ferns in the "fiddlehead" stage. Compare the shape of the young frond with any well-known object. Whyare they called "fiddleheads"? Discuss the use of certain "fiddleheads" for food.

Lesson 6. The Birds in May. Discuss the habits of the birds in May. Where and of what are they building their nests? Discuss in particular the nests of sparrows, swallows, and blackbirds.

Lesson 7. The Insects in May. Name the different kinds of insects that are about in May, as butterflies, flies, bees, grasshoppers and mosquitoes. Discuss one or two distinguishing features of each group.

Lesson 8. The Fish in May. Learn the names of some fish caught in May. From a specimen or picture study the common trout. Notice its colors, fins, mouth and general shape. What does a trout eat?

General. At school or at home prepare and plant a garden plot, and observe the growth of the plants. Make colored drawings of spring flowers. Talks about life on the farm in spring and the delights of the spring season.

GRADE 2.—JUNE.

Lesson 1. Garden Weeds. Distinguish between plants not wanted in the garden and those planted. Give several examples of each kind. Make a list of five garden weeds, as chickweeds, dandelions, thistles, couch grass, and pigweeds.

Lesson 2. The Parts of a Plant. Obtain a complete specimen of a dandelion. Make a drawing of it and learn the names of its parts as root, stem, leaves, flowers and seeds.

Lesson 3. Common Leaves. Gather different kinds of leaves and sort out those of each kind. Distinguish maple, birch, elm, and apple leaves. From the maple leaves pick out a rock maple leaf and draw it.

Lesson 4. Caterpillars. Bring twigs covered with the larvæ of tent-caterpillar moths. Observe their colors, markings, and number of legs. Why are they called tent-caterpillars? What damage is done by them?

Lesson 5. Grubs. Dig in the soil and obtain white grubs. Compare them with caterpillars as to color, covering and legs. What do they find to eat? Why do they remain in the soil.

Lesson 6. The June Beetle. Study a June beetle, observing color, wings, legs and head. Why do they fly chiefly at night? Tell the story of the development of a beetle from the grub studied in the previous lesson.

Lesson 7. The Special Senses. Discuss the uses and names of the parts of the head. What parts of the body are used in seeing, smelling, hearing, tasting and touching? What would we miss if deprived of one or all of the special senses.

Lesson 8. Nature in June. Discuss the attractions of Nature in June. What special senses enable us to enjoy the things of Nature. Develop an appreciation for and a love of the beauties of Nature around us.

General. Represent the June landscape in colors. Make bouquets of June flowers. Notice and report the colors, songs, and habits of the birds and other living things.

GRADE 3.—SEPTEMBER.

Lesson 1. Garden Weeds. Pull all the weeds from the garden plot. Bring these or others to school and count the different kinds. Compare them, in a general way, as to roots, stems, leaves, flowers, and fruits. Learn the names of several, as thistles, chickweed, dandelion, shepherd's purse, and lamb's quarters. How are they providing for passing the winter?

Lesson 2. Common Grains. Bring specimens of grains grown in the district. Compare the leaves, stems, heads, and grains. Learn the names and make drawings of the grains.

Lesson 3. Harvesting. Make a list of all the grains grown in the district. Discuss the time and manner of cutting each, the drying, the hauling, and the threshing. Compare methods with those of years gone by.

Lesson 4. Autumn Wild Flowers. Gather wild flowers, and compare them particularly as to the number, shape, size, and colors of the flowers. Notice provisions for scattering the seeds of each. Learn the names of five or six.

Lesson 5. Coloration of Leaves. Examine specimens of colored leaves and try to answer the questions,—What part of the leaf colors first? What are the first colors to appear? What trees show the first colored leaves? Does color in leaves ever appear before frost? Is frost the cause of the coloring?

Lesson 6. The Birds Prepare for their Journey. Observe and discuss the signs among the birds of preparation for leaving, such as the gathering in flocks, the loud chattering, and the hearty feeding. Discuss possible accidents on their way to the south.

Lesson 7. The Different Stages in the Life of an Insect. Look on cabbage plants for the green larvæ of the cabbage butterfly. Put them, with pieces of leaves, in bottles having cheese-cloth tops. Observe the color, legs, and habits of the caterpillars. Look for change from caterpillar to pupa. Catch an adult—the yellow cabbage butterfly—and compare the different stages in its life.

Lesson 8. The Sky in September. After observations made by pupils discuss the position of the sun at rising, at noon, and at setting, and the general appearance of the sky at sunset. Compare the beauty of the landscape and the sky in September with other months. What is meant by the term "harvest moon"?

General. Pull the weeds from the garden plot and put the plot in good condition. Observe the changes in the weather and the appearance of the landscape. Report the first frost, and note any damage done. Try to distinguish young birds from old birds.

GRADE 3.—OCTOBER.

Lesson 1. An Apple. Provide each pupil with an apple. Study its shape, colors, spots, stem, and bud. Draw it. Cut it in two pieces, taste and smell the flesh, count the number of seeds, and notice the seed cavities.

Lesson 2. Orchard and Garden Fruits. Make a list of those grown in the district and classify them as tree, vine, and bush fruits. Discuss the use of each kind and how it is kept for winter use.

Lesson 3. Color and Taste of Fruits. Collect specimens of wild and garden fruits. Classify them in different ways: (1) as to color, (2) as to size, (3) as to taste. What color is most common? Why?

Lesson 4. A Potato and a Turnip. Compare specimens as to shape, color, buds, and the hardness, color, and taste of the flesh. Discuss the use of each.

Lesson 5. The Potato Beetle. Put specimens of beetles in bottles. Look for specimens in the potato field. Observe the colors, number of legs, two pairs of wings, and head. How will it spend the winter? Discuss the different stages in its life, and the damage it does.

Lesson 6. The Falling of the Leaves. Gather specimens of fallen leaves, and distinguish maple, oak, beech, and elm leaves. Which trees drop their leaves first? Notice that on beech trees and on certain oak trees the leaves color but do not fall. Teach that the different colors of leaves are the colors of the waste materials left in the leaves.

Lesson 7. The Value of Dead Leaves. Discuss the uses of dead leaves, (1) in covering and protecting the roots of plants, (2) in covering seeds and fruits, (3) in enriching the soil by their decay. In what way might dead leaves on our lawns be used?

Lesson 8. An Ear of Corn. Count the number of rows and the number of kernels in a row. Pull off several kernels and notice their shape, hardness, color, and how attached to the ear. Are all the kernels on an ear the same shape and color? Examine an ear showing different varieties.

General. Gather vegetables and flowers from the garden plot, and put the latter in good condition for winter. Report the first ice formed. Note the effect on the plants of sufficient cold to make ice. Observe the disappearance of the birds. Watch the effect of wind on the fallen leaves.

GRADE 3.—NOVEMBER.

Lesson 1. How Fruits Protect Themselves from Animals. Collect different wild fruits, and observe the different coverings. Divide them into different groups, as (1) those with burs or prickly husks, as the fruits of horse chestnut, beech, and hazelnut, (2) with a bitter covering, as of butternut and hickory, (3) with bitter meats, as in acorns, and (4) with hard shells, as in different nuts.

Lesson 2. How Seeds are Scattered. Examine different seeds and fruits for means of dispersal. Find examples of those carried by wind, by animals, by water, and by birds.

Lesson 3. Why Seeds are Scattered. Discuss the advantages of seed dispersal to the plant, and the disadvantages in many cases to man.

Lesson 4. The Drying and Preserving of Fruits. Have each pupil cut an apple into quarters and dry the latter at home. What takes place when fruits are dried or evaporated? Discuss the making of preserved fruits, the use of sugar, the boiling, and the air-tight jars.

Lesson 5. How Wild Animals Prepare for Winter. Discuss the different ways, as (1) becoming fat, (2) laying away food, (3) thicker covering, (4) remaining active. Illustrate by reference to the habits of the bear, chipmunk, red squirrel, rabbit and beaver.

Lesson 6. How Domestic Animals Prepare for Winter. Discuss the changes, if any, in our domestic animals in autumn. Bring out the thought that they have learned to depend on man for winter protection.

Lesson 7. Sheep. Their appearance, covering, feet, habits, food, flesh, and care during the winter. How many different colors observed? Tell about the black, curly wool of the young of Karakule sheep from which Persian lamb coats are made.

Lesson 8. Relation of the Sun to Changes in Temperature. Compare November days with June days as to length of day and night, position of the sun at noon, and amount of heat and light obtained during the day. Show the relation of these changes to the general temperature.

General. Notice effects of temperature changes on plants, animals, earth, and water. What birds are seen in November? Are any insects still active?

GRADE 3.—DECEMBER.

Lesson 1. Two Evergreens. Study specimen twigs of two evergreens, as white pine, and balsam fir. Notice color, covering, size, form, and arrangement of the leaves of each. Compare as to leaves, odor, bark, buds and cones. Learn the name of each specimen. Make drawings of the leaves.

Lesson 2. Cones. Collect as many specimens of cones as can be found. Compare them as to size, shape, color, and scales. Of what use are the scales? Remove some and look for seeds. Compare the seeds of different cones. How are the seeds scattered? On what trees did the cones grow?

Lesson 3. The Bark of Trees. Collect specimens of bark from the trunks of old trees, or from the wood-pile. Compare the different kinds of bark as to color, thickness, layers, odor, roughness and ridges. Account for the roughness, or ragged appearance in some cases? Of what use is the bark to a tree?

Lesson 4. Birds in December. Describe the birds seen during this month. What food do they obtain? Where do they find shelter? Tell the story of the English sparrow in America.

Lesson 5. Cleanliness among Animals. How should we care for our bodies and our clothing? How do we wash ourselves? How do birds, cats, dogs, cows, and horses keep themselves clean? How can we assist our domestic animals in their efforts to keep clean?

Lesson 6. The Sky in December. A discussion, after observations by pupils of the position of the sun at noon compared with its position during the summer, and the time of sunrise and sunset. Teach the location of the North Star and discuss its relation to the North Pole.

Lesson 7. Reindeer. Show pictures of reindeer and the countries where they live. Describe reindeer as to size, covering, color, horns, feet and legs. Describe the country where they live. On what do they live and how do they get it in winter? Of what use are reindeer to the people of Arctic regions.

Lesson 8. With Santa Claus from the North Pole. Discuss an imaginary trip from the North Pole with Santa Claus. Describe the means of travelling, the appearance of the country at different places, including the covering of the earth, the kinds and appearance of trees, if any, the animals that might be seen, and the difficulties in connection with the journey.

General. Poems and stories of the climate, habits and dress of the people, and the Christmas celebrations in other countries. Decoration of an evergreen tree for the Christmas closing.

GRADE 3.—JANUARY.

Lesson 1. The Evergreens. Obtain twigs of two evergreens different from those already studied, as hemlock, and spruce. Compare the twigs as to color and smoothness of the bark, the cones, and the number, shape, length, color, and arrangement of the leaves. Draw the leaves. Learn the names of the twigs.

Lesson 2. Animal Coverings. Make a list of different kinds of animal coverings, as feathers, fur, hair, wool, bristles, spines, scales, shells, and smooth skin. Give examples of animals having the different coverings, and briefly discuss the relation of its covering to its habits

Lesson 3. Fur. Examine different kinds of fur worn by the children and try to name each kind. From what animal was each taken? Why do we wear furs? Does the fur of a wild animal ever change in color or thickness? Make a list of the fur-bearing animals of the district.

Lesson 4. Wool and Hair. What garments worn by the children are made of wool or hair? Which gives a warmer covering? Make a list of animals with wool or hair? Compare hair with fur as to warmth.

Lesson 5. The Human Skin. Examine the skin on the back of the hand. Compare this covering with other coverings as to thickness, warmth, and cleanliness. Examine the skin on different parts of the hand, and note differences in thickness, smoothness, markings, and sensitiveness. What keeps the skin soft and smooth? Discuss the use of mutton-tallow for chapped hands.

Lesson 6. Feathers. Examine a few feathers from hens, geese or ducks, and from birds. Compare them as to colors, shape, softness, fineness, and dryness. How are the feathers fastened to the bird? What is the use of the large feathers and the fine ones respectively? Why should ducks and geese have oily feathers and owls very fluffy ones?

Lesson 7. Winter Visitors. Are any birds or other animals seen during this month which are new arrivals? Look for the snow bunting, pine grosbeak, and snowy owl. Show pictures of these and describe them. What do they find to eat? Why do they come south in winter?

Lesson 8. Snow-Storms. Discuss the relation of winds to snow-storms. What is the prevailing direction of the wind in fine weather and what in stormy weather? What other signs of approaching storms are there? Are snow-storms of any use? Do they ever do any harm?

General. Observation of the weather changes, the birds and other wild animals, and the appearance of the trees particularly after a snowfall. Read the birds' poems and pieces on fur. Read and tell stories about winter sports in this and in other countries.

GRADE 3.—FEBRUARY.

Lesson 1. Native Plants Used in Winter. Make a list of those used during winter. Classify them as to fruits, grains, and vegetables. What part of the plant is used in each case? How has the part eaten been kept, and where?

Lesson 2. How Vegetables Should be Kept. Place a carrot or parsnip, and a potato in a dark, cool place; another in a dry, warm place; and another outdoors. Bury one in deep soil. Notice and discuss results after two or three weeks.

Lesson 3. Foreign Plants Used for Food. Make a list of fruits, spices, grains, and other plant foods obtained from other countries. What part of the plant is used? Discuss the packing and transportation of the fruits.

Lesson 4. Wild Animals of Other Countries. Make a list of those native to other countries most often heard of or seen at a circus. Discuss the covering of each and its suitability for the climate of that country. Which give us furs? What do the others give us?

Lesson 5. A Piece of Board. Examine a piece of board from a pine or other tree. Discuss the different stages in the life of the wood from the tree to the board. Show pictures of lumber camps and logging operations. What is meant by the term "stream-driving"? Are any of these operations carried on in the home district?

Lesson 6 The Use of Boards. Make a list of articles in the room made from wood. Make a list of the principal tools used by a carpenter in making things from wood. Distinguish between "hand-made" and "factory-made."

Lesson 7. Heating Our Homes. What substances are burned to make heat for our homes? Where are these substances obtained? How many kinds does the district provide? In what different ways is heat taken to different parts of the house? Discuss the starting of a fire in a common stove, and the precautions which should be taken.

Lesson 8. Lighting Our Homes. Light a candle, and a spirit or oil lamp. Compare the lights. Which gives more light? Which is safer? Compare these lights with others, now often used. Tell about the use of tallow candles in early days. What light was used next? What is the latest light?

General. Observation of the weather changes, and of winter birds and other animals. Which day during the month was coldest, warmest, most stormy, most windy, or most calm? Talks and readings about the snow-houses of the Eskimos.

GRADE 3.—MARCH.

Lesson 1. Tree Buds. Bring twigs from different trees and compare the buds as to size, shape, color, covering, number and position. Make a sketch of each kind. What do the buds contain? Of what use are the bud-scales? Distinguish three or four common trees by the buds.

Lesson 2. The Potato. Examine the specimens placed under different conditions last month. What are the conditions under which potatoes, or other vegetables, kept best? Do any of the potato tubers show growth? If so, from what? What are "eyes" on the potato?

Lesson 3. The Cow. Discuss the general appearance, colors, covering, habits, food, and uses of cows. From a picture make an outline drawing. What is made from the hide, horns, hoofs, and bones of a cow?

Lesson 4. The Care and Uses of Milk. Fill two small bottles with milk. Leave one in the warm room and place the other in a cool place. After a few days compare the specimens. Under what conditions does milk keep best? General discussion of the care and uses of milk.

Lesson 5. The Horse. From a picture make an outline drawing of a horse and compare with the drawing of the cow. Compare the horse with the cow as to general appearance, covering, feet, food, habits, and intelligence. Which costs more, and about how many dollars?

Lesson 6. Signs of Spring. Discussion of observations of signs of spring, as the melting snow and ice, running water, appearance of bare ground, "pussies" on the willows, insects, young animals, and the return of the birds. Why does the sun give more heat?

Lesson 7. The Return of the Birds. What birds have stayed all winter? Have any new birds arrived? Name and describe them. Discussion of the life of the birds while absent and the journey each way. Trace on a map the general routes of the birds from Canada to the West Indies, Central America and South America.

Lesson 8. The Work of Running Water. Report observations and discuss the work of water in tearing away earth from hillsides and banks of streams, carrying it to low, level places, and sorting and dropping it to form beds of gravel, sand, and mud. What is dropped first, what last?

General. Observation and reference to the equal days and nights, the high position and warmth of the sun at noon, and the direction and force of the prevailing winds. Report the first appearance of different birds, and the first butterfly, fly, bee, earthworm, frog, toad, and other animals. Start a spring calendar

GRADE 3.—APRIL.

Lesson 1. Squash and Pumpkin Seeds. Draw them. Notice shape, scar, and covering. Remove the shell and examine the seed within. Look for the little plant. Plant in damp sawdust or earth behind glass and observe growth. How does a squash plant get out of its coat?

Lesson 2. The Growth of Seeds. Plant pea, bean, or squash seeds at different depths in each of three pots or cans. Place one in darkness, and two in good light and warmth. Water one of the latter regularly and leave the other unwatered.

Lesson 3. What Seeds Require during Growth. After two weeks observe the results of the experiments in Lesson 2, and discuss the conditions under which seeds grow best.

Lesson 4. Catkins. Look for catkins on trees. How many kinds can you find, and what are the names of the trees? Note the shape, structure, and color of the catkins. Distinguish those which bear pollen from those which receive the pollen. Make drawings.

Lesson 5. The Frog. If possible catch a frog and keep it in a dish with water and stones. Note the shape, covering, colors, legs, feet, and habits of the frog. Look for eggs in pond and put them in water. What sounds does a frog make?

Lesson 6. The Toad. Obtain a specimen and keep it with the frog. Compare them as to size, color, covering, and habits. On what do frogs and toads live? Feed them flies. Are they useful or harmful animals? Look for toad eggs.

Lesson 7. Sparrows. From observations of pupils, and from pictures, compare the song sparrow and the vesper sparrow as to size, color, notes, and habits. Learn to distinguish these two outdoors. Do you see any sparrows which are different? How are they distinguished? What are their names?

Lesson 8. A Spring Calendar. Draw a form for a spring calendar under the headings date, name of object, description, and remarks. Decorate the calendar with drawings of buds or flowers.

General. Enter observations of birds, flowers, and other objects in the spring calendar. Observe the changes in the landscape with advancing spring. What sounds can you distinguish?

GRADE 3.—MAY.

Lesson 1. A Window-Garden. Plant seeds of nasturtium, mignonette, or other hardy garden flowers in pots or boxes and place in sunny windows. Use a good garden soil. Place glass over the box until the seeds have germinated. Water regularly. Discuss the making of the window-garden.

Lesson 2. The Use of Roots. Pull up specimens of plants started last month and carefully examine the roots. Try to distinguish between fibres and root hairs. Of what use to the plant is the root?

Lesson 3. A Spring Flower. Obtain specimens of the white or purple trillium. Make colored drawings of the plant. How are the leaves arranged? How are the parts of the flower arranged? Observe the number, shape, and color of the sepals, petals, and stamens. What enables the trillium to blossom so early?

Lesson 4. Arbor Day. A discussion of the object, and of preparations for observing Arbor Day. Why called Arbor Day? Draw a plan of the school grounds and discuss ways of improving the appearance of the grounds and building.

Lesson 5. An Elm Twig. Provide each pupil with a twig. Draw it and notice buds, flowers, or leaves. Do flowers or leaves appear first? Describe the flowers. What other trees send out flowers first?

Lesson 6. Bird Homes. Examine old bird nests, found during winter, of the robin, chipping sparrow, or other birds. What materials are used? What birds are now busy building new nests? Are any old nests used again? Where do the English sparrow, chipping sparrow, song sparrow, robin, martin, and other common birds build their nests?

Lesson 7. Bird Music. Discuss the different notes and songs of the common birds. Which are the best singers? What birds do not sing? Why do most birds sing? Try to imitate their songs and recognize them when heard.

Lesson 8. The Tent-Caterpillar. Look on apple trees for branches showing caterpillars and their tents. Observe the size, colors, covering, legs, and mouth-parts of the caterpillar? Why are they called tent-caterpillars? What damage are they doing?

General. Continue observations and reports of new birds and flowers and enter them in the spring calendar. Practical garden work at school or at home in the preparation and planting of a garden. Observe Arbor Day by planting trees, shrubs, and flowers. Draw a plan of a garden plot.

GRADE 3.—JUNE.

Lesson 1. The Care of the Garden. Discussion of the methods and importance of weeding, stirring the soil, watering, and caring for the garden. What harm would weeds do if left? Of what use is stirring the surface soil?

Lesson 2. The Common Dandelion. Special study of a complete plant. Of what use to the plant is the fleshy root? The rosettes of leaves? Notice the hollow flower-stem. Is the dandelion flower a single flower? Examine carefully and count the number of florets in a head. Look for stamens. How are the seeds scattered?

Lesson 3. Maple Leaves. Collect leaves of several different kinds of maple. Make a drawing of each kind and compare the different shapes. Learn the names of the different kinds.

Lesson 4. The Garden Weeds. Look in gardens for five different kinds of weeds, as thistle, chickweed, lamb's quarters, and couch grass. Compare them in a general way as to size, shape, color, and arrangement of leaves and flowers. Learn the names and how they are spelled.

Lesson 5. Nature's Colors. Make a list of the different colors used by Nature. Which is the most common color in June? What other colors are common? Make a color sketch of a landscape scene.

Lesson 6. The Humming-Bird. Describe its size, colors, bill, and movements. What makes the sounds? Why does it visit flowers? Where does it build its nest? Does it ever rest?

Lesson 7. A Grub Injurious to Plants. Dig in the garden for the fat grub of the June beetle. Compare with a caterpillar as to covering, color, legs, and habits. What damage can grubs do? What can be done to prevent damage by grubs?

Lesson 8. June Weather. Discuss the length of day, the position of the sun at noon, the warmth of the sun, and showers in June in relation to plant growth. In what month do plants make the greatest growth and why? When are the pastures best?

General. Reports of birds, insects, and flowers. Are any trees or plants yet in fruit? Care for the garden plot and put it in good condition. Are any garden flowers in blossom?

GRADE 4.—SEPTEMBER.

Lesson 1. The Nasturtium. Study a complete specimen. Notice the soft stem, the rounded leaves, how the leaf-blade is held by the leaf-stem, the yellow cup holding the other parts of the flower, the five petals, the long spur, and the eight stamens. Discuss the use of the long spur, and of the bright colors of the flower. What insects visit the nasturtium?

Lesson 2. The Sunflower. Notice the great size of the plant, the large leaves, the flower-heads, and the two kinds of florets in the head. What protects the flowers? Compare a ray-floret with a disk-floret. What is the use of each? Draw the florets. Compare the arrangement of flowers with that in asters and thistles.

Lesson 3. Crickets. Catch crickets and put them in a jar partly filled with earth and covered with mosquito netting. Observe them for a few days and then discuss their habits, calls, color, wings, legs, and head. How do they protect themselves from enemies? What do they eat? How are the sounds produced?

Lesson 4. A Fern. Gather specimens of one or two kinds of ferns. Compare with a buttercup plant. Notice that the stem is chiefly underground, and that the above-ground part is made up of leaves. Notice absence of flowers, but presence of brown dots on under surface of frond. What do these brown bodies contain? Shake the fern and look for a yellow dust resembling pollen. Point out that this dust (spores) corresponds to seeds.

Lesson 5. Plant Colonies. If possible have an excursion. Notice that plants seem to be arranged in groups or colonies, as those of roadsides, forest, pond, field, bank of stream, and garden. Give examples of plants in each group. Why do particular plants prefer particular locations?

Lesson 6. Harvesting. Bring complete specimens of oat, wheat, or other grain. Make general comparisons. Discuss signs of ripeness. What grain ripens first? What indicates fitness for cutting, for threshing, or for storing? Crush a few heads between the fingers and decide if it is ready for threshing.

Lesson 7. Dew and Frost. Describe dew and frost. Where and under what conditions is each formed? Which forms first? What is each? Breathe on the window glass. What is formed and why is it formed? Under what conditions would the dew have been frost?

Lesson 8. Causes of Changes in Temperature. Observe the shorter days and longer nights. What is the source of all our heat? When does the sun give most heat and light? What changes take place in the sun's position at sunrise, noon, and sunset each month and what relation have these changes to weather conditions?

General. Observation of seasonal changes in the landscape, the coloring and falling of the leaves, the ripening of fruit, the progress of farm work, the habits of the birds, and the preparation of other animals for winter. Put the garden in good condition. How many different kinds of weeds can you find in it?

GRADE 4.—OCTOBER.

Lesson 1. A Birch Tree. Study specimens of the bark, twigs, leaves, and fruit of the yellow birch. Notice the thin layers of the bark, the spotted bark of the twigs, the shape and colors of the leaves, and the little cone-like clusters of seeds. Crush a cone and look for the little winged seeds. How are the seeds scattered?

Lesson 2. The Falling of the Leaves. Study specimens of different kinds of fallen leaves. Classify them as to colors, shapes, and sizes. Learn the name of each species. Which trees drop their leaves first, which retain them until late in the season? Why do the leaves fall? Discuss the changes that take place before the layer of cork forms. Name a cone-bearing tree with deciduous leaves.

Lesson 3. Autumn Weeds. Gather specimens of roadside weeds, as asters, thistles, chicory, burdock, goldenrod, and mugwort, Compare them as to stem, leaves, flowers and fruits. What are the prevailing colors of autumn flowers? How are the flowers arranged? How are the seeds scattered? Lead up to relationship among most autumn plants. To what family do those studied belong?

Lesson 4. Relation of Fruits to Plants. Collect different fruits and study them in a general way as to color, odor, flesh, and seeds. What is found in a fruit? Account for the presence of the edible part in many fruits? Of what use is the edible part to animals? Distinguish between a seed, a fruit, and a vegetable.

Lesson 5. Sizes and Shapes of Fruits. Use the same specimens and compare them as to size, shape, and general appearance. What is the most common shape? Why should there be great differences as regards size? Is there any advantage to a plant in a very small fruit, in a large and attractive fruit? Among wild tree fruits what fruit is the largest, what the smallest?

Lesson 6. Color, Odor, and Taste in Fruits. Place fruits in different groups according to color, taste, and odor. What color is most common? Why? Compare ripe and unripe fruits as to color, odor, and taste. Of what advantage to the tree is the fine color, odor, and taste of the ripe fruit?

Lesson 7. The House Fly. Place live specimens in bottles, and observe colors, wings, legs, feet, and head-parts. Account for the ability of a fly to walk on the ceiling of a room. How do flies spend the winter? Why do we object to the presence of the house fly?

Lesson 8. The Mosquito. Where may mosquitoes be found in October? Why are they not so numerous as they were in June? Place some specimens in a bottle. Observe its different parts and compare with a fly. How does the mosquito spend the winter? Why are mosquitoes not wanted?

General. Observe the falling of the leaves, seed dispersal, and the preparation of plants for winter. What animals are preparing for winter? Gather the garden products and put the plot in good condition. What are the chief features of the landscape in October?

GRADE 4.—NOVEMBER.

Lesson 1. Plants in November. From outdoor observations and from a study of a tree twig and a few herbaceous plants, discuss the questions,—what plants are blooming now? Which are in seed? Which are shedding leaves? Which are dying? Which possess stout, fleshy roots? Give examples of each group and lead up to the classification of plants into annuals, biennials, and perennials.

Lesson 2. Tree Shapes. From outdoor observations, pictures and blackboard sketches, describe the chief shapes assumed by trees, as in lombardy, poplar, elm, maple, and spruce. Make lists of trees which are (1) long and slender, (2) conical, (3) umbrella shape. Of what advantage to that tree is the shape in each example? Why are most fruit-trees low and broad?

Lesson 3. Tree Trunks. Examine specimens of wood showing the bark. Count the rings of wood and determine the age of the tree. Account for th shape and diameter of the trunk. Does the trunk of a tree from the ground up to the lowest limbs increase in length? How does a tree increase in height? Why are most forest trees tall and slender?

Lesson 4. Tree Buds. Examine twig specimens from different trees and compare them as to the shape, size, color, and arrangement of the buds. What are leaf-scars? What is the position of the leaf-scar in relation to a bud? Notice the covering of buds, as scales, gum, and wool. Consider coverings in relation to insects, frost, rain, and other dangers.

Lesson 5. The Duck. From observations, and by the use of pictures, decide as to the shape, feet, bill, covering, food, and habits of ducks. Compare as to each point, with a hen. Do wild ducks migrate? Why do they dip in water? Why do their feathers not become wet?

Lesson 6. The Turkey. From outdoor observations, and by the use of pictures discuss the shape, size, feet, covering, food, and habits of the turkey. Compare with a duck as to the different points. Which gives better meat? Which is raised more easily? Estimate the number of turkeys raised in the district, and the total value.

Lesson 7. The Stages in an Insect's Life. Collect specimens of caterpillars, cocoons, pupæcases, eggs, and adult insects. How many stages are there in the life of most insects? Describe the life cycle of the cabbage butterfly. In what stage does a house fly, potato beetle, cabbage butterfly, apple-tree caterpillar, and the cecropia moth spend the winter?

Lesson 8. What the Weather Does. What effect is the [illegible] weather having on trees, herbaceous plants, wild animals, birds, domestic animals, and man? What damage or benefit results from rain storms, winds, hail-storms, snow-storms, or the weather?

General. What birds remain? What other animals are still active? What have been the prevailing weather conditions during the month?

GRADE 4.—DECEMBER.

Lesson 1. Evergreens. Bring twigs of several evergreens. Compare the leaves and cones as to color, shape, size, and arrangement. Learn the names of the specimens. Why do they retain their leaves during winter?

Lesson 2. The Christmas Tree. A special study of the spruce, fir, or hemlock tree selected for the Christmas closing. Observe its form, bark, arrangement of branches, and its leaves. Draw it. What adaptations does it show for dropping a load of snow?

Lesson 3. Care of Poultry in Winter. What provisions are made for shelter and [illegible] in winter? Which can stand more cold than others? What kind of food does each require? Point out the importance of cleanliness, fresh air, clean water, exercise and good food.

Lesson 4. A Poultry Census. Make an estimate of the number of hens, ducks, geese and turkeys kept in the school district during winter. How many were raised during the year? Learn the market prices and estimate the value of the poultry in the district.

Lesson 5. Spiders. Are spiders active during winter? Look in cellars for specimens. Put them in bottles. Observe their shape, color, legs, and mouth parts. What is a web? How and from what is it made? On what do spiders live? Are they beneficial or harmful?

Lesson 6. The Winter Life of the Bees. Are any bees about? How do bumble-bees spend the winter? Discuss the life of tame bees during winter? How should they be cared for? What do they live on during winter?

Lesson 7. A Wasp Home. Look for deserted wasp nests in trees. Observe the covering. Find the entrance. Remove part of the covering, leaving the comb exposed. Notice the arrangement and size of the cells. What material is used in making the nest? How is it treated? What is the general shape of the nest and how suspended?

Lesson 8. Life Story of a Wasp. Continue the study of the wasp. Does a study of the nest give any hints as to the life and habits of the wasp? Tell the story of a wasp's life. Are wasps beneficial or harmful?

General. Observe the weather changes. How often did snow fall during the month? When was the first snow-storm of the winter? Why are the days so short?

GRADE 4.—JANUARY.

Lesson 1. The Food of Wild Animals. Make a list of common wild animals. Classify them as plant eaters, insect eaters, and flesh eaters. What animals live on a mixed diet? On what do the following animals live in winter and how do they obtain their food—deer, moose, rabbits, foxes, mice, moles, owls, partridges, beavers, squirrels, and fishes?

Lesson 2. The Food of Domestic Animals. Which live on (1) plant food only, (2) flesh only, (3) on a mixed diet? Did the wild ancestors of our domestic animals live on the same kind of food? Do the structural features of each animal tell anything about the kind of food it obtained when wild?

Lesson 3. Animal Tracks. Compare as to size, depth, shape, distance apart, and general character the tracks of domestic animals. Make drawings of the tracks of a horse, cow, hen, duck, dog, and cat. Look for tracks of wild animals and try to distinguish those of the rabbit, squirrel, mouse, muskrat, mole, deer, and partridge.

Lesson 4. The Muskrat. Describe, with the aid of pictures, the general appearance, covering, tail, head, feet, movements, and tracks of the muskrat or musquash. Compare it with a beaver. If possible examine a piece of muskrat fur. Discuss the use and value of muskrat skins.

Lesson 5. The Home and Habits of the Muskrat. Make sketches on the blackboard showing the home of the muskrat. Describe its home, habits, food, and winter life.

Lesson 6. Snow and its Uses. Look for crystals in fresh snow. How many different shapes can you find? Draw them. Apply heat to some snow in a dish and observe the change from a solid form to a liquid form and finally to a gaseous form, or water vapor. Discuss the making of snow in the air and what becomes of it. Of what use is snow to plants, animals, and people?

Lesson 7. The Moon. Describe the appearance of the moon at different times during the month. What is a "new" moon? What is a "full" moon? How often during the year do we have a new moon? What lights the moon? Why is the moon not visible at certain times? Of what use is the moon to us?

Lesson 8. The Geography of the Moon. Account for the darker and lighter parts of a full moon. What is "the man in the moon." Are the darker parts high areas or low areas? Discuss the possible origin of the moon.

General. Observe the weather changes and keep a record of the cold and stormy days. Describe the general appearance of the landscape. How does it compare with the landscape in summer? What birds are about? Feed them.

GRADE 4.--FEBRUARY.

Lesson 1. A Thermometer. Examine a Fahrenheit thermometer and discuss the making of one. What liquids are used and why? Warm or cool the bulb and observe the liquid rise or fall. Of what use is a thermometer? What kind is used in Arctic regions? Why? How does a doctor take the temperature of the body?

Lesson 2. The Chief Points on a Thermometer. Place the bulb of the thermometer in a dish containing melting ice or snow. What is the freezing point of water? If possible place in boiling water. What is the boiling point of water? Explain the meaning of zero. What is the temperature of blood? Practise reading both ways from zero.

Lesson 3. Sources of Heat. Natural Sources What part of the day is warmest? Why? Where does the earth get most of its heat and light? Compare the sun with a fire in a fire-place. Do we get any heat from the moon and stars? Why is the sun able to give so much heat?

Lesson 4. Sources of Heat. Combustion. How do we add to the heat of the sun? Discuss the relative merits of wood, coal, charcoal, peat, oil, and gas as heat givers. What fuels did the Indians use. What do the Eskimos use? Make an Eskimo lamp.

Lesson 5. Sources of Heat. Friction. Rub the hands together briskly. Rub a piece of metal on the floor or on the sleeve. Rub a stick rapidly in a groove of wood. Note results. Mention other examples of heat being made by friction. Why does a saw, a car axle, and a knife-blade become hot? Explain the "striking" of a match. Why do we rub our hands on our ears when cold?

Lesson 6. The Beaver. Describe, with the aid of pictures, the general appearance, covering, tail, feet, and teeth of a beaver. Compare with a muskrat. If possible examine a piece of beaver fur. Account for the peculiar shape and structure of a beaver's tail. Of what use are beavers? Should they be protected?

Lesson 7. The Home and Habits of the Beaver. Show pictures or make blackboard drawings of a beaver village. Describe the felling of trees, the building of the dam, and the erection of the beaver home. Discuss the general habits and the winter life of the beaver. On what does it live in winter?

Lesson 8. Review of Winter Birds. Make a list, with descriptions, of birds seen during the winter. Describe the pine grosbeak, snow bunting, horned lark, and other winter visitors. What birds remain out of sight during winter? Describe the winter life of a partridge. What do birds find to eat during winter?

General. Continue observations of the weather changes, the birds, and their habits, the winter condition of the trees, and the general landscape. During what month has the snow been deepest? When were the coldest days?

GRADE 4.—MARCH.

Lesson 1. Tree Twigs. Provide each pupil with a beech twig. Draw it. Make a list of the different points observed. Discuss these observations. What is the shape, position, and size of the leaf-scars? What caused the scar? Notice the dots or breathing pores and the annual rings on the bark. What is the position and shape of the buds? What is the age of the twig? Compare a beech twig with other twigs.

Lesson 2. Tree Buds. Provide specimens of different kinds of twigs. Compare the buds of each as to number, size, shape, color, covering, and arrangement. Make sketches of the buds. Examine a bud from each twig. What does it contain? What are the names of the trees from which the twigs have been taken? Can trees be identified by their buds? Place the twigs in water and watch the buds develop.

Lesson 3. Potato Buds. Provide specimens of potatoes, some of which show sprouts. Examine the "eyes" carefully. From what part of the potato does the sprout grow? What are "eyes"? Argue that a tuber is a stem. What is the number of eyes on the potato? Make cuttings and plant them. How many "eyes" should a cutting have?

Lesson 4. Lumbering. How are trees felled? Trace the journey of a log from the tree to the sawmill. Do all logs cut reach the sawmill? What trees are cut for lumber? What trees are represented by the different kinds of wood in the room?

Lesson 5. The Blackbird Family. When did the crows and blackbirds arrive? What evidences of relationship do crows and blackbirds give? Describe their manner of walking. Compare the crow blackbird or grackle, and the red-winged blackbird as to size, color, notes and habits. Are crows and blackbirds harmful or beneficial?

Lesson 6. The Skunk. Its Appearance. From pictures or from a skunk fur describe the size, covering, colors, feet, claws, head, and tail of a skunk. Compare it with a cat. Account for the bad odor. Describe the scent gland. Why do skunks in captivity have no odor? Are skunks beneficial or harmful?

Lesson 7. The Skunk. Its Life and Habits. What food does a skunk prefer? Why is it often seen about barns? Describe its burrow in the soil, how it passes the winter, its appearance during thaws in March, the cleanliness of its nest, and the appearance of the young in May. What are "skunk farms"? Where are they found in Canada?

Lesson 8. The Work of the Spring Sun. Discuss the relation of the sun to the longer and warmer days of March, the appearance of catkins on trees, the return of the birds, the appearance of other animals, and the melting of the snow and ice. What places lose the snow first and why? What changes in us does the sun effect in spring?

General. [illegible] the appearance of catkins, the first insects, and other observations of interest. When [illegible]

GRADE 4.—APRIL.

Lesson 1. What is a Brook. From observations and general knowledge discuss the origin, course, and general features of a brook. In what way it [illegible] beginning? How is it supplied with water along its route? Why [illegible] in and out? What becomes of its water? Why do [illegible] from summer? Read the poem "The Brook."

Lesson 2. The Work of a Brook. Dip dirty water from a brook. Allow the [illegible] Notice the sediment. Decide if running [illegible] Where did the water obtain the sediment? What [illegible] of erosion caused by a stream? When does the [illegible]

Lesson 3. What a Brook Carries. Obtain samples of gravel, sand, and mud from brook beds. Compare them. Where were the [illegible] What [illegible] Which is dropped first? Which last? Shake a mixture [illegible] and let in water and allow it to settle. Notice the [illegible]

Lesson 4. The Kingfisher. Compare with a robin as to size, shape, colors, [illegible] topknot, notes and habits. Describe its manner of catching a [illegible] Where and of what does it build its nest? When was the first [illegible] reported?

Lesson 5. The Sparrows. From observations of the birds, aided by pictures, distinguish the most common sparrows—the song, chipping, white-throated, vesper and savanna. What are the distinguishing features of each. Compare them as to size, markings, and notes. What is the prevailing color among sparrows? Why? Which is the best singer? Why is the white-throated sparrow the national bird of Canada?

Lesson 6. Differences in Seeds. Compare common garden seeds as to size, color, shape, taste, and nature of covering. Make a sketch of each, and learn to distinguish them. What is an outstanding feature of each? Plant some of each kind in damp sawdust behind glass, and observe them sprout. Which sprouts first?

Lesson 7. The Trillium. Study a complete plant as to roots, stem, leaves, and flower. What is the number, shape, and arrangement of the leaves? Are the veins parallel or netted? How many flowers does one plant bear? Describe the size, arrangement, and color of the parts of the four circles. How many stamens are there? What is the color of the petals? How many species of trillium do you know and how do you distinguish them?

Lesson 8. The Woolly Bear. Look for specimens of the brown hairy caterpillars called "woolly bears". Why does it receive that name? Place them on leaves in bottles with cheesecloth tops. Watch it make a cocoon. How did the "woolly bear" spend the winter? How many stages are there in the life of this insect? Describe the moth stage. What is the name of the moth? Is the "woolly bear" a harmful insect?

General. Observation of the returning birds, their plumage, songs, habits. Look for the first appearance of flowers. Which flower is in blossom first? When was the first frog or first toad reported? How do you distinguish frogs and toads by their notes?

GRADE 4.—MAY.

Lesson 1. Toads. If possible obtain live specimens and keep them in a vessel containing water and rocks. Feed them insects. Describe a toad. Of what use is its color, its rough skin, and its tongue? Describe its movements. What does it eat and how does it catch its prey? Look for toad eggs in masses like jelly-like strings in ponds. Place them in water and watch them hatch into tadpoles.

Lesson 2. Frogs. If possible obtain a frog from a pond and keep it in water. Describe it. Compare it with a toad as to appearance, covering, habits, and voice. In what do they differ? Distinguish, out of doors, the notes of the frog from those of a toad. Which "croaks"? Which "pipes"? Are toads and frogs beneficial or harmful?

Lesson 3. Earthworms. Dig earthworms from the garden soil and place them in a little earth in a bottle. Describe one. How does it move? Why are they called "angleworms"? What do they eat? Are they harmful or beneficial? How do they pass the winter?

Lesson 4. Violets. Gather different kinds of violets. How many different kinds can you find? Compare them as to leaves and flowers. Make sketches. How many sepals, petals, and stamens has a violet? Observe the long spur at the back of the flower. Of what use is it? Find the door that leads to the nectar-spur? Why are the petals marked and veined? Of what use is the fringe?

Lesson 5. The Hepatica. Make a drawing of the plant. Observe the stem, leaves, and flowers. Where does it grow? Look for specimens with undeveloped buds. What enables this plant to blossom so early? Does the flower offer any attractions to insects? What colors do the petals show?

Lesson 6. The Brook Trout. If possible obtain a live specimen of a brook trout and keep it in cold water for a day. Describe it as to shape, colors, covering, and movements. Why should it be so beautifully marked? Of what use are the fins? To what organs in other animals do they compare? How does a fish breathe? What does the trout eat?

Lesson 7. The Barn Swallow. From outdoor observations, and from pictures or sketches, discuss the general shape, colors, and movements of the barn swallow. Notice the red-brown vest and the deeply-cut tail. How does it differ in appearance from other swallows? How many swallows can you recognize and by what features? Where and of what does the barn swallow build her nest? When did the first one arrive?

Lesson 8. The Nature of Soil. Shake some soil in a bottle of water. Allow it to settle. Distinguish the different layers of clay, gravel, sand, or mud. Of which does there seem to be most? Mix leaf-mold with the soil. Of what parts should a good garden soil consist?

General. Draw a plan for the planting of a garden plot. Prepare and plant the plot. Observations and reports of new birds, flowers and other things of interest. What trees are in leaf first? When do sugar maple leaves appear? Observe Arbor Day by cleaning the ground, and by planting flower seeds, shrubs, and trees.

GRADE 4.—JUNE.

Lesson 1. The Eave or Cliff Swallow. Compare it with the barn swallow as to colors, length, shape of the tail, and habits. Where do they build their nests and of what materials? Describe the shape of the nest. Where is the opening? How is it lined? Describe the eggs. Which swallows arrive first?

Lesson 2. The Meadow Lark. Compare it with a robin as to size, plumpness, colors, and habits. Describe its flight and notes. Is it ever seen in the woods? When and where is the nest built? What does it eat and why should it be protected?

Lesson 3. Weeds. Make a list of common plants you know that are now in blossom. Which are weeds? Why are they called weeds? How did they find their way to the garden? Why are they not wanted in the garden? How can they be got rid of?

Lesson 4. Cultivation of the Garden. Take two dishes of soil. Stir the top-soil of one and pack the top-soil of the other. Leave them for a few days. Which is drier at the top? Which keeps in water better? Why are fresh tracks across a newly cultivated field so conspicuous? How can we aid in keeping the water in the soil?

Lesson 5. The Mosquito. Place mosquitoes in a bottle and observe their legs, wings, and antennæ. Try to distinguish two kinds by their antennæ—males and females. Explain that the male mosquito neither sings nor bites. How does the female produce the sounds and why? Why does she bite?

Lesson 6. The Life and Habits of a Mosquito. Look in the rain barrel for mosquito eggs. Obtain water containing "wigglers," and observe these larvæ. Tell and illustrate by sketches the life-story of a mosquito. How can they be destroyed? Why are mosquitoes considered harmful?

Lesson 7. The House Fly. Put specimens in bottles and observe their form, colors, legs, wings, foot-pads, and antennæ. Compare with a mosquito. Of what use to the fly is the sticky pad on the foot? In what way may it result in harm to us?

Lesson 8. The Life and Habits of a House Fly. With the help of illustrations on board, and of pictures, describe the different stages in the life of a house fly, the eggs, maggots, pupæ, and adults. If possible obtain some eggs and maggots from manure heaps. In what ways may the filthy habits of the fly result in harm to us? Discuss the part it plays in spreading diseases. What can we do to lessen the number of flies in and about our homes?

General. Keep the garden plot in good condition. Observe the birds, insects, flowers, and other things of Nature. Observe the beauty of the landscape in June. Paint a landscape scene.

GRADE 5.—SEPTEMBER.

Lesson 1. The Canada Thistle. Obtain a specimen of an entire plant, and study its roots, stems, leaves, and flower-heads. Where do you find it growing? Do grazing animals eat thistles? How does the thistle protect itself? Of what use is it? Why is it called a weed? How many kinds of thistles have you seen?

Lesson 2. Thistle Flowers. Obtain ripe and unripe heads of both Canada and bull thistle. Compare the heads as to size, color, and covering. Compare the little flowers in each head as to size, color, number, and fragrance. What protects the flower-heads? What insects have you seen visiting thistles? Examine the ripe heads and notice the means for seed dispersal. What birds eat thistle seeds?

Lesson 3. The Honey Bee. Obtain specimens of live or dead honey bees and place them in bottles. Dead drones can usually be obtained about hives. From specimens, pictures or drawings, notice the general distinction between the queen, the workers, and the drone. Make drawings to show relative size and forms. Which has the pollen baskets on the hind legs? Which has a sting? What is the special work of each kind of bee?

Lesson 4. Honey and the Honey-Comb. Compare a piece of empty honey-comb with one filled with honey. What is the shape of the cells? How are the cells placed in the hive? What keeps the honey in? From what and how is the wax of the comb, and the honey, made? What other bee products are there? How much honey will a hive produce in one season and what is the price of a pound? Of what use is bees-wax?

Lesson 5. The Life of the Bees. If possible observe bees in a hive. Discuss the life of the bees in the hive, the work of each kind of bee, the eggs, the young bees and how they are fed, the swarming of bees, and the winter life.

Lesson 6. A Potato Plant. Dig carefully around a green potato plant, and obtain a complete plant with tubers. Sketch the plant. Distinguish between roots, stems and leaves. What part of the plant is a tuber? Why? If they are stems why are they not green? Under what conditions do tubers turn green. How many tubers does each plant bear?

Lesson 7. The Potato Crop. Estimate the number of potatoes that should be obtained from one acre, if there are 3 potatoes in each hill, which are 2 feet apart in rows 2½ feet apart. How many potatoes will fill a peck? How many pecks in a barrel? Calculate the value of the potatoes on an acre at $1.00 per barrel.

Lesson 8. Apple Injuries. Examine several specimens of both poor and good apples. What differences do they show? Look for marks of any kind on the skin. What causes these scabs? Cut through the apple and look for the larvæ of insects. Why do the larvæ enter the apple? Which apples fall first? Discuss the damage and loss in the orchard caused by insects and plant growths.

General. Collect seeds of weeds, clean them and put them in bottles or envelopes, with the name when known. Start a collection of weeds by pressing and mounting some common ones. Compositions on "Harvesting" and "Nature in September." Notice the preparation of birds for their departure southward.

GRADE 5.—OCTOBER.

Lesson 1. The Apple. Take an apple in hand and describe its color, skin, shape, general size, stem cavity, blossom, basin and odor. Notice waxy covering or bloom. Cut the apple vertically in halves and another horizontally, and notice the thickness and texture of the skin, the pulp or flesh, the core, the seed cavities, and the seeds. Describe the juiciness, taste, and flavor of flesh. Describe and taste a seed. Why are seeds bitter? Make sketches of the apple halves.

Lesson 2. The Pear. Examine a pear and notice its shape, size, color, spots or markings, and stem. Draw it. Has the pear an odor? Cut a cross section through the widest part. Notice taste, texture, and flavor of flesh. Notice the core and its five divisions. Find the ring of dots around the core. Is the core fleshy? Taste the seed. Compare the pear with the apple as to the different points.

Lesson 3. The Peach. Study a peach and notice its shape, size, color, markings, and stem. Draw it. Has it any odor? Cut the peach in halves. Notice thickness and texture of skin. Notice the flesh and compare it with an apple and pear as to juiciness, taste, flavor, and odor. Describe the pit. Crack it and taste the meat.

Lesson 4. The Plum. Examine a plum and notice the color, shape, size, skin, depression at stem end, and the line or groove on one side. Notice the bloom. Rub it off. Has the plum an odor? Prick the plum with a pin and squeeze it gently. What is the color, taste, and flavor of the juice? Cut a vertical section. Notice the thin purple skin, the very juicy flesh, and the hard reddish-brown pit or stone. Compare the pit with a peach pit as to size, roughness, hardness and taste of meat.

Lesson 5. The Grape. Hold a bunch of grapes by the stem. Notice its general shape. Why is it thicker at the stem end? Are the grapes of the same size? Count the number of little bunches and the number in each little bunch. Notice the color, shape, and bloom of each little grape. Prick a grape and squeeze it. Notice color, taste, and flavor of juice. Squeeze out the contents and notice thickness and texture of skin. What color is the pulp? Examine the seeds as to size, shape, color, hardness. How many seeds in each grape? Does the number vary?

Lesson 6. The Tree Fruits of the District. Which of those studied—the apple, pear, peach, plum, and grape—are grown in the district? Estimate the number of trees and the total yield and value. Why are the others not grown? Could they be grown? Discussion of outlook for fruit-growing in the district.

Lesson 7. The Mountain Ash Fruits. Obtain specimens of mountain ash (rowan tree) fruits. Notice size, color, skin, and arrangement of the fruits. How many fruits are there in a cluster? Taste a fruit. Describe the flesh, taste, and odor. How many seeds does each fruit contain? Of what use are these fruits? How long do they remain on the tree?

Lesson 8. Wild Fruits of the District. Make a list of all fruits cultivated in the district. Make a list of wild fruits in the district used for food. Compare the lists. Are there any examples of the same fruit occurring in both lists? Are any varieties of the cultivated fruits native to the district? To what countries are the others native? Develop the thought of the development of all our cultivated fruits from wild forms.

General. Gather all garden products and use, sell, or give them away. Put the plot in good condition. What birds are about during October? Composition on "Our Native Fruits."

GRADE 5.—NOVEMBER.

Lesson 1. The Potato. Examine a potato carefully and notice its shape, color, skin, and eyes. Are there any blemishes on the skin, as scabs? How many eyes are there? What are "eyes?" Argue that the potato tuber is a root or stem. Distinguish the two ends of the potato. What are the features of each end? Has the potato any smell? Make a cross section. Draw it. Notice the thickness of the flesh. Notice the ring of faint dots just below the skin. Squeeze the milky juice from some of these layers into a dish and leave it over night. What is the fine, white powder? If you have iodine, test for starch.

Lesson 2. The Onion. Notice the size, shape, smell, and color of an onion bulb. Notice the fine lines on the outer skin. Which way do they run? What are the fibrous bodies at the base of the bulb? How many layers of thin skin covering? Make a vertical sketch of the layers or plates of flesh Where are they thickest? Look for long, thin leaves lying within. In the cross-section, notice the odor of the flesh. Teach the meaning of the term "bulb" and give other examples.

Lesson 3. The Beet. Observe color, shape, and skin of a beet. Draw it. What part of the plant is the lower part of the beet? The upper part? Give proofs. Has the beet a smell? Notice color and arrangement of leaves. Make vertical and cross sections of the beet. Notice the red and white rings. Notice white core running down to thin root. Describe the texture, taste, and odor of the beet. Is the juice sweet?

Lesson 4. The Turnip. Observe shape, color, skin and roots. Draw it. Make cross and longitudinal sections. Can the rings be distinguished as in the beet? Is there any difference in the color and taste of the flesh at different places? Compare with the beet as to color, odor, taste, and texture of the flesh. What part of the plant is the "turnip?"

Lesson 5. The Carrot. Notice color, size, shape, and skin. Where are the roots found? Notice dark wrinkles and green color of the leaf-end. Why is it green? Has the carrot any smell? Describe it. Make cross and longitudinal sections. Notice light zone in middle and pinkest zone outside. Does it show concentric rings? In vertical section notice the central core, the outside layers, the green and yellow lines. Compare the core and the outer part of the flesh as to hardness, juiciness, taste, and odor. What part of the plant is a "carrot?"

Lesson 6. The Parsnip. Notice color, size, shape, and draw it. Make cross and vertical sections. Does it show concentric rings? Is there a core like in the carrot? Test the flesh for hardness, juiciness, taste, and color.

Lesson 7. The Root-Crops of the District. Which vegetables studied are found in the district? Why are they called root-crops? Estimate the number of acres of each grown, and the yield per acre. What is the market price per barrel? Calculate the total value of the root-crop in the district. Which are exported? What use is made of the others?

Lesson 8. The Uses of Vegetables. In addition to their use for food for animals and persons, what particular use is made of potatoes, and sugar-beets? What substance is plentiful in potatoes? What in beets? Describe the manufacture of starch from potatoes and of sugar from sugar-beets. What countries are the chief producers of the sugar-beet? Are any grown in the home district or province?

General. Observations of the changes in the landscape, the "hunter's moon," and of the preparation of the plants and animals for winter.

GRADE 5.—DECEMBER.

Lesson 1. What the Weather Does. Effects of different kinds of weather on us in our play and work, on birds, on other animals, on plants, and on the landscape in general. What would be the effect of a heavy frost in summer? Of a heavy snow-storm? What effect has a heavy rain in winter? Discuss the importance of foretelling the different changes.

Lesson 2. What Weather is. Name the different kinds of weather, as cloudy, windy, fair, rainy, cold, hot, and sultry. What kind have we to-day? Describe the last heavy rain-storm. Where did the rain come from? Where did the clouds get the moisture? What became of the clouds after the rain? What are the three chief things that go to make up weather?

Lesson 3. The Clouds. Breathe upon a piece of cold glass. From what did the drops of rain come? Why does a tea-kettle become dry? What becomes of the water? What is evaporation? Distinguish between water vapor and steam. Which can you see? Why and of what are clouds formed?

Lesson 4. Kinds of Clouds. How much of the sky is covered with clouds to-day? Describe them on the board. Describe the different kinds of clouds you have seen. What kinds cover the sky when it is raining? Distinguish between dark grey clouds, called storm clouds, and those piled up like great balls of cotton, those in long, level streaks, and those resembling white feathers.

Lesson 5. The Stars. Are all the stars of the same size? Can you count them? Compare one with the sun. Develop the thought that most stars are suns very far away. Do all the stars twinkle? Are all of the same brightness? Have you noticed any groups? What is the "Milky Way?" Of what use are the stars? Of what use in bible days? What are "shooting" stars?

Lesson 6. The Two Dippers. Make a sketch on the blackboard showing the north star and the two dippers in relation to each other. How many stars in each dipper? Locate the north star by means of the pointers. Are the stars in the big dipper of the same brightness? Notice the big dipper at different times during the evening and find if it moves. In what direction does it move?

Lesson 7. The Christmas Moss. Obtain specimens from the woods of the trailing club-moss used for decorations. Distinguish between stem and leaves. Notice fan-shaped leaves. Under what conditions does it grow best? Look for seeds or fruits. Do you find any fruiting bodies? Compare it with mushrooms as to mode of reproduction by spores.

Lesson 8. The Christmas Holly. Obtain specimens of holly if possible. Make drawings, using colors, of the leaves and berries. Notice stiffness, smoothness, lustre, and margin of the leaves. Where does the holly grow? Does it grow here? Notice color, size, and shape of fruit. Why is holly much used for Christmas decorations?

General. Observation of the landscape, the evening sky, and the stars in December. Compositions on the "Preparation of Animals and Plants for Winter," and on "Christmas."

GRADE 5.—JANUARY.

Lesson 1. Evergreens. Bring specimens of the twigs of as many evergreens as can be found. How many distinct kinds are there? Name them. Can you distinguish more than one variety of pine or spruce? Compare the leaves of each as to arrangement, size, length, shape, color, and stiffness. Distinguish the different trees by means of their leaves.

Lesson 2. Different Kinds of Wood. What evergreens in the district are being used for lumber? Why are pine trees not common? Compare pieces of planed wood of pine and spruce, and, if possible, of fir, cedar, and hemlock. What is the color of the wood in each case? Which is the softer? Finer grained? Prettier? More easily worked? Why is pine wood the most valuable of soft woods? Start a collection of woods.

Lesson 3. A Piece of Coal. Bring specimens of hard and soft coal. Notice the color, hardness and weight of specimens. If convenient see which will burn better by holding a small piece of each on a flame by means of pinchers. Discuss the uses of coal. What did people burn before coal was discovered? What kinds are used at your house? What is the cost per ton? What is coal and where is it obtained?

Lesson 4. Coal Mines and Mining. By a discussion of observations of the conditions in a swamp develop the thought that coal is plant life buried long ago and much compressed. Make sketches on the board showing seams of coal with rock between. How is coal broken away from the seam? How is it lifted to the surface? Are there any coal mines in your province?

Lesson 5. Charcoal. Break off a piece of wood partly burned. Compare it with coal as to color and hardness. Describe the making of real charcoal by slow burning of wood piled in heaps and covered with turf. Why is very little air admitted to the pile? Of what use is charcoal?

Lesson 6. The Winter Life of Our Fur-bearing Animals. Review the studies of the appearances of fur-bearing animals. Review the habits of our fur-bearers. What fur-bearers are found in the district? In the province? How does each spend the winter? What is the value of its pelt? Discuss the raising of fur-bearers in captivity. Do you know of any fur-farms?

Lesson 7. The Winter Life of Our Domestic Animals. What kind of food does a cow, horse, hog or sheep require most of? How much of each food does each animal require per day? Estimate the cost of feeding each animal during the winter? Discuss in a general way the care and feeding of stock during the winter.

Lesson 8. Fruits Exported and Imported. Make a list of the fruits raised in the district. Which of these are exported and at what price? Estimate the total quantity and value of fruits exported per year. What fruits are imported and from what countries? Estimate the prices and value per year of fruits imported.

General. Observation of the weather changes, thaws, snow-storms, and cold, and their effect on the landscape. Observation of the winter life of birds. What they find to eat and how they find shelter. Composition on the "Winter Life of Animals."

GRADE 5.—FEBRUARY.

Lesson 1. Crystals. Examine, preferably with a lens, some fluffy snow. Can you make out distinct forms, called crystals, of various shapes? Examine some coarse salt, sugar, or blue vitriol. What are the shapes of the crystals? Dissolve some salt in water and place in a tube. Suspend a white string in the solution and place the tube in a window. Try alum in another tube and blue vitriol in another. In which bottle do the crystals form first? What are the colors and shapes of the crystals?

Lesson 2. Salt. Dissolve some salt in water and place it in a saucer. Watch the crystals appear as the water evaporates. What are the shapes of the crystals? If possible examine a specimen of rock salt. Where is rock salt obtained? What are "salt licks?" Of what use is salt to us? What happens to people who cannot obtain salt? How is dairy and table salt obtained? Why is the ocean called the "briny deep?" What are the chief properties of salt?

Lesson 3. Sugar. Compare some coarse sugar with some coarse salt as to crystals, color, taste, odor, hardness, and lustre. Which dissolves more readily? What are the uses of sugar? Which is more useful, salt or sugar? From what is granulated sugar obtained?

Lesson 4. How Sugar is Made. Describe the manufacture of sugar from the sugar cane or from sugar beets. What part of the plant is used? Compare with the making of maple sugar from the sap of the maple. How is sugar made white? What is raw sugar, brown sugar, treacle, molasses, loaf sugar, granulated sugar, golden syrup?

Lesson 5. Tea. Examine some tea leaves as to color, odor, and taste. Compare with leaves that have been soaked in water. What do the soaked leaves lack that the others possessed? What has become of that? From what is tea obtained? Describe the plant, and the steps in the drying of the leaves? Why are some tea leaves blacker than others? Which is better, the black or the light-colored? Where does the tea-plant grow? Of what use is tea to us? Should children drink tea?

Lesson 6. Coffee. If possible obtain some coffee beans and examine them. What is ground coffee? Compare ground coffee with tea as to color, taste, and aroma. Have raw unroasted coffee beans any taste or smell? What develops these? Describe the coffee plant. Where does it grow? What part of the plant do we use? Of what use is coffee to us? Should children drink coffee? What is postum?

Lesson 7. Cocoa. Examine some cocoa. Compare it with coffee and tea as to color, taste, and odor. What is cocoa? Is cocoa made from a cocoa-nut? If possible obtain a pod from a cocoa-tree. Describe the cocoa-tree, where it grows, what part of the plant is used, and the preparation of cocoa from the nuts. Distinguish between chocolate and cocoa. Compare cocoa with tea and coffee as to wholesomeness.

Lesson 8. Pepper. Examine some pepper. Compare it with cocoa as to appearance, taste, and color. From what is pepper obtained? What part of the plant is used? Describe the plant? Where does it grow? Of what use is pepper? Distinguish between black pepper and white pepper.

General. Continue observation of the weather. What birds are about during this month? Are there any new arrivals? What other animals are seen? Composition on the "Appearance of Trees in Winter."

GRADE 5.—MARCH.

Lesson 1. The Pig. Tell about the wild hog of Europe and Asia, its general appearance, bristles, and habits. Compare with our domestic hog. How does the pig's nose differ from that of other animals? Are its habits naturally filthy or cleanly? How should we care for it? Distinguish between pork, bacon, and ham.

Lesson 2. The Goat. Compare a goat in size, general appearance, head, covering, feet, and habits with a sheep. In what points do they resemble each other closely? Refer to the many breeds of goats in different countries and the particular use of each, the wild goats of Switzerland, Germany, and other European countries, the Cashmere goat of Thibet and the Angora of Asia Minor.

Lesson 3. The Products of the Goat. Discuss the use of goat milk in many countries and compare the milk in quantity and quality with that from a cow; also the use of goat's milk in making different varieties of cheese, as Roquefort. Describe the wool of mohair goats, as those of Cashmere and Angora, and its use in making shawls and many other fabrics. What use is made of the skin of the goat?

Lesson 4. Hens. The Best Egg Breeds. Have pupils give their experiences in keeping hens. Which breeds lay best? Make a list of the principal egg breeds, as Brown Leghorn, White Leghorn, Black Minorca, and point out the distinguishing features of each. How many eggs should a good layer give during the year? Calculate the value of the eggs.

Lesson 5. Hens. Meat Breeds. Make a list and give the distinguishing features of the chief meat breeds, Brahmas, Cochins, Plymouth Rocks, and Langshans. How do they differ from the egg-producers? What breeds are good layers and also good for meat? What breeds are much kept at home and why?

Lesson 6. The Care and Feeding of Hens. Description of a good poultry house. The chief points in the care of hens, as cleanliness, fresh air and exercise, feeding and quality and amount of food required for laying hens.

Lesson 7. The Orchard in Winter. Examine the trees in the orchard and look for signs of winter injury, as broken limbs, bark gnawed by mice, frozen twigs, work of birds. Look for insect eggs and cocoons. What eggs are found in bands around small twigs? Discuss the injury in winter and how this can be prevented.

Lesson 8. Black Knot. Obtain specimens of black knot from fruit trees, as cherry or plum trees. Notice the injury done to the limb. Explain the life history of black knot and the necessity of cutting it off.

General. Observation of effect of weather changes on the landscape, plants, and animals. Look for the first buds. Are any other animals about?

GRADE 5.—APRIL.

Lesson 1. What the Earth is made of. Examine specimens of rocks and distinguish kinds as to color, hardness, structure, and other properties. Where were these specimens obtained? Of what are they a part? Lead up to the thought that the solid part of the earth is composed of different kinds of rocks. How many different kinds can each pupil find in the district?

Lesson 2. Milky Quartz. Obtain specimens of common milky quartz, and of other varieties if possible. Try to scratch it. Try scratching glass with it. What is one of its chief properties? Do you know of anything harder? Refer to the different varieties of quartz, as rock crystal, amethyst, agate, jasper and flint, and the use of each.

Lesson 3. Kinds of Rocks. Compare specimens of clay-stone (slate), sandstone and pudding-stone. Notice that pudding-stone is a mixture of gravel, sand, and mud; sandstone only sand and mud; and clay-stone only hardened common clay. Recall lessons on how beds of gravel, sand, and clay are formed. Look for quartz in rocks.

Lesson 4. Granite. Compare granite with the water-formed rocks as to hardness, crystals, and variety of minerals in it. Notice presence of three or four distinct minerals, as quartz, mica, felspar, and hornblende. Lead up to the thought that granite has been formed from other rocks by great heat, as around volcanoes.

Lesson 5. Building Stones. From the specimens of rock on hand have pupils select those they have seen used for building purposes, as sandstone and granite. Which stones are used for the building itself? Which are used for foundations? Which is more easily worked, sandstone or granite? Which is the more durable building stone? Which polishes better? If possible examine a specimen of polished granite.

Lesson 6. The Weathering of Rocks. Break specimens of granite, sandstone, and other rocks and compare the surface which has been exposed to the weather for a long time with the fresh surface. Examine specimens, the two pieces of which crumble readily. Discuss the action of the weather and water in wearing away rocks and thus forming soil. What effect has frost on rocks and soil?

Lesson 7. Seed Selection. Give each pupil a handful of beans, peas, wheat, and other seeds, sort out each kind and name it Divide those of each kind into good seeds and poor seeds. What points should be noticed in selecting good seed? Plant both kinds under the same conditions and observe results.

Lesson 8. New Arrivals among the Birds. Discuss the observations of the pupils of new arrivals among the birds. Make a list of those that arrive in March and April and discuss the distinguishing points of each.

General. Observation of new birds and the appearance of flowers, insects, and other things of interest. Keep a calendar of spring observations. What trees are already in blossom?

GRADE 5.—MAY.

Lesson 1. What Garden Soil Contains. Examine with a lens a specimen of good garden soil. What can you see? Do all the particles seem to be the same kind? Describe them as to color, size, shape, and kind. Sift some soil. Notice presence of sand, gravel, clay, and decayed vegetable matter. Of what use is the gravel and sand? Of what use is the clay and humus? What proportion of these makes a good soil?

Lesson 2. Preparation of the Garden Plot. Discuss the preparation of soil for planting. Why do we plow, harrow, and rake the soil? Why is fertilizer added? Of what benefit is cultivation while the plants are growing? Illustrate by the preparation of a garden plot.

Lesson 3. How to Plant Seeds. Discusss the proper portion, depth, and distance apart in rows, and covering of seeds. Illustrate by planting seeds in different portions, at different depths, and by covering them differently. Notice results after a few days or weeks. Why should large seeds be planted deeper than small seeds? Why should light earth be firmed after planting?

Lesson 4. Propagation by Cuttings. From a geranium or coleus plant make a cutting (slip). Discuss the making of a cutting. Have each pupil make some at home. Keep in water and look for the appearance of roots. What plants can be propagated in this way? Make a cutting from a willow, a poplar, and a currant.

Lesson 5. Propagation by Grafting Bring a limb from a tree, split it down a few inches, make some scions from apple twigs and illustrate the stages in cleft-grafting. Point out the necessity of using grafting wax to prevent drying. Encourage the children to make grafts at home.

Lesson 6. How to Plant a Tree. By the use of blackboard illustrations discuss the removal of a tree, the pruning of the branches and roots, the preparation of the hole, and the planting of a tree. Illustrate this in a practical way on Arbor Day. Encourage the children to plant trees at home.

Lesson 7. Why Trees are Sprayed. Look on trees for insect eggs and larva, as tent caterpillars. Examine twigs for presence of oyster-shell, bark-lice. Discuss insect and plant pests in a general way as to how these can be kept down by spraying with different mixtures.

Lesson 8. May Flowers. Review reports of observations on spring flowers. Make a list of those that blossom in May, with the distinguishing features of each. Who has found the greatest number of different flowers?

General. Preparation and planting of a garden plot. Observe Arbor Day by planting trees, shrubs, and flowers. Continue bird and flower calendars. What flowers are out in May? What birds return in May?

GRADE 5.—JUNE.

Lesson 1. Fish and Fishing. Make a list of the fishes found in local waters. What are the distinguishing features of each? Draw a trout, a salmon, or a shad, and name the parts. How is each fish caught? Which are good for food purposes?

Lesson 2. The Life of a Fish. How do fish breathe? What do they eat? How do they obtain their food? How do they protect themselves? Discuss the different stages in the life of a fish from the egg to the adult, as illustrated by the life story of a salmon.

Lesson 3. Apple Blossoms. Bring in specimens of apple blossoms. Draw one. Name calyx, corolla, stamens, and pistil. Discuss the use of each. What protects the blossoms during the winter? Of what use are color and odor in the blossom? Look for insects in the flowers. What good or harm may they do? At what times are the blossoms sprayed?

Lesson 4. Bees and Apple Blossoms. Why are bees so common among apple blossoms? What do they want? How many kinds visit apple blossoms? Discuss the carrying of nectar and pollen and the use made of both. Of what benefit to trees are the bees?

Lesson 5. The Bumble Bee. Catch a specimen and keep it for a few days in a bottle. Compare it with a honey bee. How did it spend the winter? Where are their nests found? Tell the story of the life of a bumble bee. Is it a useful or harmful insect?

Lesson 6. The Life Story of the Tent-Caterpillar. Bring twigs covered with the larvæ of the tent-caterpillar. Observe it. Discuss and illustrate by specimens, pictures or drawings, the four stages in the life of the insect. Is it harmful or beneficial? What could children do to keep it down?

Lesson 7. The Baltimore Oriole. From observations of pupils, and from pictures, describe a Baltimore oriole. Look for its hanging nest. Discuss the long nest and habits, and describe the peculiar nest of this fine bird.

Lesson 8. Plant Struggles. Discuss in a general way the struggles to live which plants have (1) with wind, (2) with drought, (3) with other plants, (4) with animals, (5) with men. Lead up to the importance of protecting and caring for the garden plants by providing support for the tall ones, by watering during the dry weather, by pulling out weeds, and by protecting the garden from animals.

General. Observation and reports of birds and flowers continued. What new birds have arrived in June? What new flowers have appeared? What insects are most common or most active? Study the landscape in June and its representation in water colors

---

GRADE 6.—SEPTEMBER.

Lesson 1. The Sweet Pea. Describe the roots, stem, and leaves. What are the swellings on the fibrous roots, and what do they contain? Notice the winged stem. How many leaflets in the compound leaf? Argue that the tendrils are modified leaflets. Of what use are the tendrils? Draw a complete leaf.

Lesson 2. The Sweet Pea Flower. How many sepals, petals, and stamens? Find the banner, wings, and keel. Of what use is each? What covers the stamens and pistil? What relation does the structure of the flower bear to visits by bees? Study the fruit. How are the seeds scattered?

Lesson 3. The Sweet Clover. Where does this plant grow? What insects visit it? Pull up a complete plant. Look for nodules on the roots. Compare it as to root, stem, leaves, flowers, and fruits with the sweet pea. Do you think they are related? In what way does the sweet clover growing in poor soil prepare the soil for good plants?

Lesson 4. The White Clover. What insects are seen on white clover blossoms? What are they getting? Point out that white clover honey is the best. Look for nodules on the roots. Has it erect or creeping stem? Draw a leaf. Notice behaviour of leaves at night. Notice that the flowers are in heads. Examine one flower. How does the bee act when collecting nectar? Of what use to the clover is the honey bee? To what family does the clover belong?

Lesson 5. The Corn Plant. Observe a complete specimen. What kind of roots has it? Notice the roots which help support the stem. Notice the joints or nodes on the stem. Cut across at a node and between nodes (internodes). Compare the structure of the stem at the two joints. Why is it solid at a node? Notice the little growth on a leaf where it leaves the stalk. Of what use is this growth? Describe the shape of the leaf. Why does it tear easily lengthwise? Draw a leaf. How are the leaves arranged? Are the edges of the leaf straight or ruffled?

Lesson 6. An Ear of Corn. Notice the arrangement of the ears on the stalk in relation to the leaves. Are two ears borne on the same side of the stalk? Compare the outside husks of the ears with the green leaves. What part of the plant does a husk correspond with, and why? How does the inner husk differ from the outer? Follow a silk thread downward. To what is it attached? What part of the flower is it? Count the rows of kernels and the kernels in a row. Do any rows disappear towards the top? Why? Break an ear in two and sketch the broken end. Notice attachments of kernel.

Lesson 7. Five Roadside Weeds. Collect specimens of ragweed, smartweed, curled dock, sour dock, broad-leaved plantain and green foxtail. Which have fleshy roots? Which have formed rosettes of leaves? Will they survive the winter? Why do you think so? Compare in a general way the stem, leaves, flowers, and fruits. How do they provide for scattering their seeds? Why should we call them weeds? Learn the names. Why did each receive its common name?

Lesson 8. Weed Seeds. Collect several kinds of weed fruits and seeds. Study and draw them. What is the meaning of sweetness, color, flavor, and odor in the seed or fruit? Why do plants make their seeds attractive in some cases? Discuss the parts played by animals in scattering seeds and fruits. What particular devices for dispersal do the seeds studied show?

General. Begin a collection of weeds and weed seeds. Press the plants between newspapers and mount in scribblers. Keep seeds in bottles or envelopes. Look on fruit trees and shrubs for signs of injury by insects and plant diseases. Bring injured fruits or twigs. Composition on "Harvesting." Notice preparation of birds for leaving. Gather flowers and vegetables from the garden.

GRADE 6.—OCTOBER.

Lesson 1. Puff-balls. Gather specimens of puff-balls. Where are they found? Notice size, shape, surface, and color of ball. "Puff out" some of the powder for each pupil and examine it. What is its use? Explain that it corresponds to seeds and will give rise to new plants. What color are puff-balls when young?

Lesson 2. A Mushroom. Collect specimens of common mushrooms called "toadstools." How many parts has it? Notice the cap, gills, skin, rings around stem, and sometimes a cup at the base of the stem. The ring or cup may be absent or present according to the species. Shake the gills and try to obtain a powder corresponding to the powder of puff-balls. Notice the absence of green colors in mushrooms. Point out that some mushrooms are good to eat and some are poisonous. Only those who know the edible specimens should decide.

Lesson 3. The Velvet Sumac. Bring twigs, leaves, and fruit of the Sumac. Why is it called velvet sumac? Notice the colors, shape, and arrangement of the leaves. How many leaflets on the largest leaf? Study the fruit. Cut away the red flesh and look for the seeds. Look for insects on the sumac "bobs."

Lesson 4. The Pearly Everlasting. Where are they found? Are they weeds? Do cattle or other animals eat them? What is the general color of the plant? What covers the stem? Notice the shape, arrangement, and color of the leaves and flowers. Try to distinguish the kinds of flowers in each head. Why do flowers of this plant keep so well in the house?

Lesson 5. Root-Crops. Make a list of the roots grown in the district. Estimate the number of bushels of each. What is the leading root-crop and why? What is the principal use of each root? What is the market price per bushel or barrel? Why are they called root-crops?

Lesson 6. The Pumpkin. Obtain a small pumpkin with a piece of vine attached. Draw the leaf and the fruit. Observe shape and roughness of skin and leaf. Notice how the fruit is attached. Why is the stem larger just where it joins the fruit? Cut the pumpkin in halves crosswise and notice thickness of rind. What part is used for food? How are the seeds attached? Count the number of seeds.

Lesson 7. The Garden Snail. If possible obtain a few specimens of snails and place in a jar with moist earth and moss. Where are snails found? How do they move? How does it cling to the side of a glass vessel? What sort of track does it leave behind? Observe the shell, feelers, and eyes, and discuss the use of each.

Lesson 8. Disposal of Agricultural Products. Make a list of the agricultural products of the district. Which are exported? Which are consumed at home? Where are the markets and what are the market prices for potatoes, apples, grains, butter, cheese, eggs, and poultry?

General. Gather the garden products and clean and prepare the plot for winter. Compositions on "Thanksgiving Day," "Autumn," and the "Hunter's Moon." Observe the preparation of birds and other animals for winter.

GRADE 6.—NOVEMBER.

Lesson 1. Methods of Seed Dispersal. Observe different weed seeds and fruits of trees and classify them as to methods of dispersal—by wind, by water, by birds, by fur-bearers, by man, by explosive means. Describe the carrying and scattering of weed seeds by trains and boats. In what way were most of our bad weeds carried to us and from what countries or provinces?

Lesson 2. The Apple. Sketch and describe the shape of two varieties of apples. Compare and describe the apples under the points—shape, size, color of its skin, streaks, blotches, blush, stem cavity, basin or bud cavity, and bloom. Cut the apples crosswise and notice thickness and toughness of skin, color and texture of the flesh, and the and size shape of the seeds and seed cavities. What is the core?

Lesson 3. The Apple Tree. Study twigs from an apple tree. Sketch a twig. Distinguish the new growth. Observe leaf-scars. Notice color, size, and arrangement of new buds. Distinguish spurs from true branch twigs. Look on the spurs for evidence of last summer's apples. Compare the fruit-buds found on the spurs with the ordinary leaf-buds on the twig.

Lesson 4. The Codling Moth. Examine wormy apples and obtain specimens of the larvæ of the codling moth. How large is the larva? How does it act when disturbed? What color is the body? What color is the head? How many pairs of legs? Where did it enter the apple? What sort of a burrow does it make? In what way does it damage the apple? Tell the story of the different stages in the life of the moth, with brief description of moth. How does it spend the winter?

Lesson 5. Ladybird Beetles. Bring specimens of the little spotted beetle so common in autumn. Notice the shape and colors. Count the number of spots. Has each specimen the same number of spots? Notice the hard wing-covers and the true wings beneath. Which are used in flying? Place some on a house-plant leaf covered with plant lice and observe. Develop the thought that ladybeetles are among our most useful insects because they feed on plant lice.

Lesson 6. The Garter or Golden Snake. Capture a snake and place it in a box of earth with a glass cover. Notice the coloring and markings of the body, the eyes, and nostrils and mouth. How does it move? Why does it thrust its tongue out? Place flies and other insects in the box. What does it eat? How does it spend the winter? Develop the thought that all our northern snakes are harmless.

Lesson 7. Geese. From observations of domestic geese, and from pictures describe geese as to general appearance, colors, bill, feet, shape of neck and nature of feathers. How many different kinds of geese do you know of? Describe wild geese and compare with domestic geese.

Lesson 8 Habits of Geese. What is the food of geese? What conditions do they prefer? How do they walk? How do they defend themselves? Describe the flight of wild geese and the signs of their migration. How does a goose make her toilet? Describe how she oils her feathers. Of what value are geese?

General. Notice the effect of frost on soil. When did the first snow fall? What birds are about?

GRADE 6.—DECEMBER.

Lesson 1. Common Grains. Bring specimens of wheat, barley, buckwheat, and oats. From the mixture sort out the different kinds and learn the names. Make a sketch of each grain. Compare them as to shape, size, covering and color. Find where it was attached to the plant. Which have grooves? Try to remove a husk or covering. In which are you successful? Examine the meat in them. Crush a few grains of each kind. Of what is the white powder chiefly composed? What is the test for starch? Of what is the covering chiefly composed? What is the test for gluten?

Lesson 2. Different Kinds of Flour. Examine a specimen of wheat flour and, if convenient, also one of buckwheat flour. Compare with wheat-bran and with oatmeal. From what parts of the seed is flour made? What is bran? What is oatmeal? Briefly describe the processes in the making of flour. Tell about the old millstone and the modern roller process. What is whole meal, bran, flour? Why is flour sticky when wet? What makes it white and powdery? What are tailings? What is Graham flour?

Lesson 3. A Loaf of Bread. Mix some flour with water. Cut a slice of bread. Allow it to stand an hour. Then knead it in water. Why does the water turn milky? What is the test for starch? After the starch is washed out the dough is tough and elastic. To what is this due? Make chewing gum by chewing the wheat. Describe the making of bread. Why is yeast added? Is the formation of bubbles caused by escaping gases due to starch or gluten? What happened to the bubble when the bread was baked? Explain that heat converts some starch on the outside of the loaf into dextrin or caramel, which is brown and sweet.

Lesson 4. The Christmas Fern. Look in the woods for a green fern resembling rock polypody and called Christmas fern. Compare it with polypody as to size of front, size, and arrangement of fruit-dots, and other points. Do all the fronds bear fruit-dots containing spores? Are the sterile or the fertile fronds more attractive? Of what use are the sterile fronds to the plant? Why can some ferns remain green during winter? Are the fronds alive?

Lesson 5. Influence of Weather upon Plants. Trace the general weather changes since September, in temperature, rain, snowfall, and wind. In what way have these changes affected annual plants, other herbaceous plants, shrubs, and trees? In what different ways have plants prepared for these changes in weather? In what condition are plants during the cold weather?

Lesson 6. Influence of Weather on Animals. What plants furnish food for domestic animals? What stems, roots, seeds or bark are eaten by wild animals? How have the weather changes affected these food supplies? How are the domestic animals affected? What animals disappear when cold weather comes? Which remain active? Which hibernate? Which die? What animals are least affected? How do toads, frogs, snakes, flies, mosquitoes, bears, beavers, wolves, foxes, and porcupines spend the winter?

Lesson 7. The Winter Homes of Wild Animals. From observations of the pupils and by use of pictures and blackboard drawings describe the winter homes of the beaver, chipmunk, porcupine, muskrat, groundhog, mole, bear, rabbit, fox, and mink. Discuss the relation of the home to the life of the animal. How do the animals provide for warmth, cleanliness, and ventilation?

Lesson 8. The Winter Homes of Domestic Animals. From the observations and experience of the pupils discuss the shelter requirements of our domestic animals during winter. Consider the question of warmth, cleanliness and ventilation in relation to homes for horses, cattle, sheep, and poultry. Are there any model stables or poultry houses in the district? Do the habits of the wild ainmals give us any hints as regards the care of our domestic animals?

General. Observation of the habits of the birds and other animals during December. Distinguish the evergreen trees out-of-doors.

GRADE 6.—JANUARY.

Lesson 1. What is Weather? How many kinds of weather can you name? Distinguish between weather and climate. What are the chief elements that go to make up weather? What is the source of all our heat? What conditions determine the amount we get each day? What is the source of moisture in the air? What different forms may water take in the air, (1) as a gas, (2) as a liquid, (3) as a solid? What is the relation of heat to wind and to the different forms of water in the air?

Lesson 2. Weather Forecasts. How may a foreknowledge of the weather benefit the sailor, farmer, carpenter, orchardist, merchant, and people generally? Give practical illustrations in each case. What precautions could each take to prevent harm or loss? Where may you find forecasts? Read one from a recent newspaper. Did it come true? Where are the forecasts made? Who makes them? How are they made? Relation of telegraphy to forecasts.

Lesson 3. Storms and Storm Signals. In what direction do most of our storms travel? About how fast does a storm or cold wave travel? How may the time of its travel at any particular place be estimated? Distinguish between a local and a general storm. Under what conditions do local storms generally occur? How are weather signals made? What flag indicates wind, rain, or temperature? What is a fog horn? Where and why are steam whistles sometimes used? Find out the meaning of one, two, or three long or short blasts.

Lesson 4. How to Measure the Weather. What are the chief features of the weather to be considered in forecasting a storm? How is temperature, pressure, and the humidity of the air measured? How is rainfall caught and measured? Describe a simple rain-gage. How is the velocity of the wind measured and recorded? Describe a simple form of wind-gage. Distinguish between a zephyr, a breeze, a gale, and a hurricane. In what way is the wind used by man?

Lesson 5. The Thermometer. Why do we need a thermometer in the classroom? For what does a doctor use one? Breathe on the bulb of the thermometer. Why does the liquid rise? Describe the making of a thermometer. Why is mercury or alcohol used in place of water? Explain the meaning of zero on the Fahrenheit and on the centigrade. Mix some ice and water. Notice temperature on either thermometer. Boil some water. What is the boiling point on either thermometer? Which is greater, one degree centigrade or one degree Fahrenheit?

Lesson 6. The Barometer. Make or describe the simplest form of barometer—a long tube closed at one end, filled with mercury and inverted in a vessel of mercury. Describe the ordinary form of barometer with the elastic sack. Press up against the sack. What effect has this on the mercury in the tube? When mercury rises or falls in the tube what do we infer about the air? Is the pressure great or low just before a storm?

Lesson 7. Phases of the Moon. Review the chief points in connection with the moon, its origin, its size, and its surface. By the use of bodies to represent the sun, the earth, and the moon, explain the movement of the moon around the earth and account for the different appearances as new, first quarter, and full moon and the different positions of the horns of the moon at different times.

Lesson 8. Relation of the Moon to Weather. Develop the thought of the different attractions and repulsions between the sun, earth, and moon. What evidence have we that there is an attraction between the moon and the earth? When are tides highest? Lowest? Apart from the tides, has the moon any other relation to our weather conditions? Has the position of the new moon anything to do with the weather? Prove the weakness of the common belief as regards the moon and weather.

General. Observation of birds and other animals in winter. Keep a weather record. Compositions on "Lumbering," "The Sights in Winter," and "Winter in Canada."

GRADE 6.—FEBRUARY.

Lesson 1. The Points of a Cow. By the use of a picture and a drawing on the board, learn the names of the parts of a cow, as horns, ears, forehead, cheek, shoulder, withers, knee, back, side, belly, udder, rump, hip, thigh, hock, shank, hoof, tail, and switch.

Lesson 2. Chewing the Cud. What is the principal food of a cow? Make a drawing on the board showing the mouth, gullet, and the four chambers of the stomach of a cow, the paunch, honeycomb, manyplies, and the rennet bag. Describe the movements of the food from the mouth to the intestine. What is the cud?

Lesson 3. The Dairy Cow. In advance of the lesson ask each pupil to carefully observe the general shape of the body, the small head, large stomach, hip bones, shoulders, neck, and other features of the good dairy cow. Discuss these observations, using a good picture and also an outline drawing on the board. What features are desirable to make a good dairy cow? How much milk will a good cow give in a day? How much during a year?

Lesson 4. Beef Cattle. Compare, using observations at home, pictures, and drawings on the board, dairy cattle and beef cattle as to the different points. What are the chief points needed in beef cattle and why? Which are more hardy?

Lesson 5. The Points of a Horse. Make a drawing of a horse on the board and name the different points, as muzzle, cheek, throat, forelock, neck, crest, mane, withers, back, croup, dock, thigh, hock, canon, fetlock, and hoof.

Lesson 6. The Horse Family. Divide the family into three groups: True horses, asses, and zebras. Notice a few distinguishing features of each. Illustrate the primitive horse with five toes on each foot. How many toes has the modern horse? Mention the chief kinds of modern horses and the chief requirements of each kind, as ponies, racing horses, hunters, carriage horses, and draft or work horses.

Lesson 7. Sheep. From their observations, pictures and blackboard drawings, describe sheep as to general shape, covering, head parts, and feet. What do they eat? How do they defend themselves? Why do they naturally go in flocks? Tell about wild sheep. Discuss wild traits in domestic sheep.

Lesson 8. The Uses of the Parts of a Sheep. Discuss the use of many different parts of a sheep, as the flesh for food, the fleece for yarn and cloth, the skin for leather, the fat for tallow, the intestine for "catgut," and the hoofs, horns, and bones for different purposes. Estimate the cost of keeping a sheep for three years and the returns obtained from it.

General. Compositions on "Life in Winter." Observe the stars, and the phases of the moon. Have any new birds appeared?

GRADE 6.—MARCH.

Lesson 1. A Magnet. Examine a bar or horse-shoe magnet. Explain that a horse-shoe magnet is only a bent bar magnet. Of what substance is a magnet composed? What substances will it lift? Rub a needle placed under paper one way with one pole of the magnet. See if it will act on a magnet. How are magnets made? Float the magnetized needle on cork in water. Hold one pole of the magnet near either end. Notice that the magnet repels one end of the needle and attracts the other end. Observe that there are two poles called north and south, and that like poles repel and unlike attract.

Lesson 2. The Compass. Lay a small bar-magnet on a piece of wood floating on water or float a magnetized needle on water. In what direction does it come to rest? Does the same end always point northward? Account for this. Of what use is a compass? Does the magnetic north pole of the earth correspond to the geographical north pole?

Lesson 3. Latitude and Longitude. Discuss the shape of the earth. Draw it on the board. Locate the north and south poles and the magnetic north pole. Where and what is the equator? What is meant by latitude? By longitude? Is there any natural line from which longitude may be determined? Explain the meaning of degree. How can a sailor in mid-ocean tell from the north star how far north of the equator he is?

Lesson 4. Standard Time What motions has the earth? In what direction does it turn on its axis? Why is it noon in London before it is noon in America? What is meant by London time? By Washington time? By local time? By standard time? From what meridian do we take our time? How many different standard times are used in Canada?

Lesson 5. The Value of Sunshine. Why does the weather bureau always report the amount of sunshine each day and night? What effect is sunshine having on the snow and ice? On what days does the snow melt fastest? What is the most striking feature of spring weather? What effect has sunshine on plants? Illustrate by house plants. Does sunshine affect animals? How? What effect has sunshine upon our health?

Lesson 6. Influences of Climate. Distinguish between weather and climate. Compare the weather now with that of three months ago. Compare the climate with that of the far north, with the equator, in the far south. What are the chief zones? Mention some plants and animals peculiar to the frigid zone, to the torrid zone. What is the chief agent that fixes plant life in the different zones? Does it control animal life also? Which climate do you prefer?

Lesson 7. Surface Changes. At what time of year is there most water in the streams? Why? What makes the streams so muddy? Account for the formation of a ditch, gully, ravine. What kind of soil washes most easily? Least easily? What becomes of the sediment that is carried down by streams? Which kind of soil is dropped first? Explain formation of clay, sand, and gravel beds. What would each become if hardened.

Lesson 8. Soil Makers. Examine a piece of rock which has been exposed to the weather. Account for its appearance on the outside. Account for the caves and worn cliffs near the sea coast. What effect has freezing on a water-soaked body? What effects have growing plants on rocks? Lead up to the discussion of the work of running water, freezing, and plants, and other agencies in tearing down rocks and making soil.

General. Observation of returnng birds. Which have returned? What other signs of spring are there? Composition on "Maple-Sugar Making."

GRADE 6.—APRIL.

Lesson 1. Kinds of Soil. Obtain specimens in bottles of clay in powder form, sand, gravel, and humus (decayed vegetable matter) from the woods). Compare them as to origin, color, fineness, and stickiness. Which is of vegetable origin? Which of mineral origin? Which do you think is richer in plant food? Mix equal quantities of clay, sand, gravel, and humus. What is loam? Compare it with ordinary garden soil. Which soil would seem best for plants? What is marl? What is peat?

Lesson 2. How Soils Retain Water Put the same quantity of clay, sand, gravel, humus, and loam in separate shallow dishes. Pour the same quantity of water on each. Leave exposed in a warm place for a day or two. Which retains water best? Which dried out first?

Lesson 3. How Cultivation Helps to Retain Water. Pour the same quantity of water into each of two dishes. Put the same quantity of loam into each dish. Pack the surface of the soil firmly on one dish and on the other sprinkle loose soil on top. Place in the sunlight. After a day or two examine the soils. Which retains more water? What is the effect of cultivation as regards retention of water?

Lesson 4. How Water is Lifted through the Soil. Dip glass or other tubes with fine bores downward in water. Notice the water rise in the tubes. In which does it rise highest? Why is this called capillarity? Explain the presence of fine, tube-like openings downward between the particles of soil and that water rises as in the glass tubes. Are the tubes fine or large in compacted soil, in clay soil, in sandy soil? Discuss the relation of cultivation to capillarity.

Lesson 5. Changes in Seeds during Germination. Plant some seeds of beans, peas, squash, corn or wheat in moist sawdust or earth behind glass. What is the first change taking place? Account for the swelling of the seeds. Why does the coat of the bean or pea wrinkle? Where does the coat break open? Taste seeds after a few days and compare with dry seeds. Why has the starch changed to sugar? Which appears first, the root, skin, or leaves? Which grows faster? What changes takes place in the size of the seeds? Account for this. What part of the seed furnished the stem and root? What is the purpose of the rest of the seed? Why should the biggest and best seeds be used in planting?

Lesson 6. Plants Need Air. Place a few grains of wheat in each of two shallow vessels. Cover the seeds in one dish entirely with water, and only moisten well the others. Cover each with glass and keep in a warm place for several days. Which seeds germinate? Why did the others not germinate? Discuss the importance of air in the germination of seeds.

Lesson 7. Plants Need Water. Remove a plant from the moist soil or earth where it has been growing and lay it on the table. What happens to it? Place the roots in water and notice the change that takes place in a short time. What is the first indication that a plant is suffering for water? What effect has drought on the appearance of plants If drought is long-continued, what will the result be? What kinds of soil absorb water best? Which retain it longest? What crops require much water?

Lesson 8. Plants Need Warmth and Sunlight. Why do plants in a window turn toward the glass? When do most seeds germinate? Why? When are plants most active? Compare the vegetation in the three zones of the earth. Perform simple experiment to show what most plants need warmth. What kinds of soil are warmest? Which kind absorbs most heat? Does the color of the soil influence its temperature? When do we wear white clothing and why? When dark clothing?

General. Notice the effects of winter frosts on the land. Observe and become acquainted with the birds. Look for the first flowers in bloom and learn their names. Discuss plans for and make preparations for Arbor Day. Draw a plan for a garden.

GRADE 6.—MAY.

Lesson 1. How Birds Fly. Wave a feather up and down in the air. Does the air offer any resistance? Do the same with a paper fan. Why do birds flap their wings when they begin to fly? What arrangement of the wing feather provides for a large downward pressure? What is the use of a rudder on a boat? What is the bird's rudder? Is the hen's tail closed or open when flying?

Lesson 2. The Eyes and Ears of Birds. From previous observations of the eyes and ears of a hen, discuss and try to answer the following questions:—How many colors are there in a hen's eye? Does the hen wink as we do? Has she any eyelids? Does she turn her head when looking at you? Why? Compare a hen's eye with a human eye. Describe the ears of a hen. What indicates the position of the ear Can a hen see and hear well?

Lesson 3. The Form and Use of Beaks. Previously observe the beaks of poultry and other birds. Make drawings on the board of the beak of a hen and of a duck. Compare them as to size, shape, and use. How is the beak in each case adapted to the bird's mode of getting food? Has a hen any teeth? Does she need any? Of what use are the saw-teeth along the edge of the duck's bill? Where are the nostrils in a hen or duck? Compare them. Make drawings of the beaks of wild birds. Distinguish between insect-eaters and seed-eaters by the shape of the bill.

Lesson 4. The Feet of Birds. Compare a duck's foot with a hen's foot. Make drawings. Which has longer toes? Sharper claws? What sort of a track does each make? Which of the toes in a duck are connected by a web? Of what use is the web? Can a hen swim? Discuss the relation of the structure of the foot to the bird's habits.

Lesson 5. The Birds in May. Review observations of the pupils on the migration of birds. Make a list of those already reported, with a brief description of each. What are the prevailing colors of those reported? What are the chief activites of the birds during May. Distinguish five sparrows, two blackbirds, and five other migrants. What are the chief enemies of birds? Are most birds beneficial or harmful? Give reasons.

Lesson 6. Principles of Planting Seed. When are most seeds planted? Why? Are any grains planted in autumn? When are seeds of wild plants planted? Why are not all garden seeds planted in autumn? Why must nuts and other hard seeds be planted in autumn? Why should only good seed be planted? Test 100 seeds of wheat, and also some garden seeds, by placing them on a plate between layers of blotting paper, or cotton flannel. Cover with another plate. Keep moist and warm for a few days.

Lesson 7. Principles of Planting Space. At what distance apart should the seeds of each garden plant be planted? Why? Make a list of plants that are tall and slim, another of plants that need much space, another of very small plants, and another of very large plants. Discuss the relations of the habits of the plant to the space between seeds. Why are some plants planted in rows, some in hills, and others broadcast? Discuss the relation of rows and hills to sunlight, cultivation, and soil food.

Lesson 8. Principles of Planting. Depth. Experiment by planting common seeds at different depths, and in different positions. How does the size of a seed, or the amount of plant-food stored up in it, influence the depth at which to plant it? What happens if seeds are planted too deep? Not deep enough? What is a good rule as regards depth? At what depths should each of the common garden seeds be planted?

General. Prepare a garden plot at school or at home and plant it according to a definite plan. Carry on some simple experiments in planting seeds at different depths, at different distances, and comparing selected good seeds with selected poor seeds. Observe and report the birds and flowers, and try to learn their names. Keep a spring calendar.

GRADE 6.—JUNE.

Lesson 1. The Common Sucker. If possible, have a specimen of sucker. Make a drawing of it. Describe the shape of its body, the colors, the covering, fins and tail, mouth, eyes, and nostrils. How is the mouth adapted to get the food the sucker likes best? Where do you find suckers? Where do they spend the winter? Where do they go to spawn? Why is the flesh considered poor in quality? Has the quality of flesh in a fish any relation to its mode of life?

Lesson 2. Other Common Fish. Make a list of the fish known in the district. What are the distinguishing features of each? Which are used for human food? Why? How are the fish caught and preserved? Where did the fish caught spend the winter? Discuss the importance of the fish industry in the district.

Lesson 3. Shell Fish. Obtain a specimen of any shell fish found in the district, as oyster, crab, lobster, or clam. Why are they called shell fish? Which shell fish live in salt water? Which are found in fresh water? Which shell fish are used for food? Are the shells of any use? Describe the shell of the specimen obtained. How did the animal increase in size? How are shell fish caught?

Lesson 4. The Strawberry Plant. Obtain a complete garden strawberry plant. Describe its roots, leaves, and flowers. What are runners? Of what use are they? Describe a strawberry blossom as to calyx, corolla, stamens, and pistil. Do all the flowers contain both stamens and pistils? Which would produce berries? Why do insects visit strawberry blossoms? Of what use to the strawberry plant are the insects? What part of the plant becomes the berry?

Lesson 5. The Strawberry Patch. Make an estimate of the total area of land in the district planted to strawberries. What is the yield per acre and the total value of the crop in the district? Is growing strawberries a profitable industry? Discuss the preparation, planting, and care of a strawberry patch.

Lesson 6. The Brake or Bracken. Gather specimens of the common bracken or brake fern. Where does it grow best? What is the general shape of the frond? What does it resemble? Look under the edges of the little pinnules for fruit bodies, which will produce spores. Of what use are spores? With what in common plants do they correspond? Tell the life-story of a fern. How many kinds of ferns can you find? What are "fiddle-heads?"

Lesson 7. The Ways of the Ant. Where are ants' nests found? What are they made of? If possible have some ants in a bottle. Observe them as to size, color, legs, and habits. Are they all of the same size? How do they act when the nest is disturbed? On what do ants live? Discuss the different stages in the life of an ant.

Lesson 8. The Colorado Potato Beetle. Obtain specimens of adults, eggs, and larvæ. What are the distinguishing features of each? Trace the life cycle of a potato beetle. In which stage does it eat most? How does it spend the winter? What damage does it do? What is done to control it?

General. Observation of the birds in June, particularly their nesting habits. Have any new birds arrived during June? Collect and press June flowers and try to learn the names of all. What tree sheds its fruit in June? Care for the garden plot and record the results of experiments.

GRADE 7—SEPTEMBER.

Lesson 1. The Parts of a Flower. Obtain specimens of tall buttercup flowers. Notice that the parts of a flower are in circles or groups, and that each circle, or portion of a group, is made up of parts. Learn the names of the circles and parts—the calyx with its sepals, the corolla with its petals, the stamens with their filaments and anthers, and the pistil with its ovary, style, and stigma, and pollen.

Lesson 2. The Uses of the Parts of a Flower. Discuss the uses of the different parts of a flower—the sepals for protection, the petals to attract insects, the anthers to bear pollen, the stigma to receive pollen, and the ovary to bear seeds.

Lesson 3. The Relation of Insects to Flowers. Notice flowers of various shapes, as those of the sweet pea, tall buttercup, and mustard. Look for the presence of insects in flowers. What are the insects getting? Discuss their work in carrying pollen from one flower to another.

Lesson 4. The Parts of a Leaf. Obtain specimens of maple, elm, ash, and other leaves. Notice the stem, blade, midrib, and veins. Which have distinct divisions of the blade called leaflets? Divide the leaves into two groups, simple leaves and compound leaves. Give several examples of each group.

Lesson 5. The Position and Arrangement of Leaves. Observe the leaves on complete specimens of dandelion, buttercup, and other plants, and on twigs of maple, elm, and other trees. Divide all leaves into root-leaves and stem-leaves. As regards arrangement on the stem classify them as alternate, opposite, and whorled. Give examples of each.

Lesson 6. Leaf Forms. Observe the shape or form of common tree leaves. Make outline drawings of each general shape. Classify them as round, linear, oblong, ovate, oval, etc. Give examples of each group.

Lesson 7. The Function of Leaves. If possible, there should be simple experiments to show that leaves give off water, that they breathe as animals do, and that green plants also take in carbonic acid gas during the day. Discuss these points, and also the work of green leaves in digesting food and making starch and other plant products.

Lesson 8. The Coloring and Falling of Leaves. Compare green leaves with colored leaves. Notice the various colors shown by autumn leaves. Compare the leaves of evergreens with those of deciduous trees. Discuss the changes that take place before leaves fall—the breaking up and withdrawal of the green coloring substance, the formation of the layer of cork at the base of the petiole, and the growth of the bud in the axis of the petiole.

General. Collect, press, and mount in scribblers, common leaves and wild flowers. Observe the preparations of the birds for their migration and the activities of insects. Write compositions on "Harvesting," "Seed Dispersal," and "Migration of Birds." Work in the garden.

GRADE 7.—OCTOBER.

Lesson 1. The Position and Direction of Stems. Obtain specimens of different kinds of stems. Discuss their manner of growing as regards natural position and direction. Classify them as upright, erect, climbing; twining, trailing, prostrate, or creeping stems. Give several examples of each class.

Lesson 2. The General Structure of Stems. Compare pieces of corn stems with those from trees. Notice the absence of a true bark and rings of woody tissue in the corn stem, and the presence of these in tree stems. Discuss the meaning of the terms "inside grower" and "outside grower."

Lesson 3. Kinds of Stems. Compare stems of annual plants with these from shrubs or trees. Distinguish between fleshy stems and woody stems. Examine a potato tuber, the underground part of couch grass, an onion bulb, and other stem forms. In each case argue that the part is a stem.

Lesson 4. Functions of Stems. Consider the different kinds of stems studied and discuss the work and uses of stems to the plant (1) in conducting food materials, (2) in storing up food materials, (3) to hold the leaves and flowers.

Lesson 5. Kinds and Forms of Roots. Examine the roots of buttercup, dandelion, thistle, carrot, and other plants. Distinguish between fibrous roots and tap-root. Give examples of each. Notice and draw the different forms of tap-roots. Notice the prop-roots of the corn plant.

Lesson 6. The Functions of Roots. Consider the different roots studied and discuss the functions of roots (1) for taking in food from the soil, (2) for storing up food materials, (3) for holding the plant in place.

Lesson 7. The Parts of a Plant Used for Food. Discuss the value of plants in furnishing us with food. What parts of plants are used for food purposes by animals? What part of the plant is eaten in celery, carrot, lettuce, potato, wheat, corn, bean, rhubarb, and other common plants?

Lesson 8. The Storage of Food Plants during Winter. Make a list of all plants used for food purposes. What part of the plant is used in each case? Discuss the best methods of gathering, storing, and protecting those parts for winter use.

General. Continue collection of plants, seeds, and fruits. Gather the garden products and put the garden in good condition for winter. Calculate the value of the garden products and the net gain or loss. Calculate the yield and the value per acre of the common field crops.

GRADE 7.—NOVEMBER.

Lesson 1. Length of Life in Plants. Obtain complete specimens of mustards, chickweeds, and other annual plants—also of burdock, vegetables and other biennial plants. What term is applied to those that live longer than two years? Give examples of annuals, biennials, and perennials.

Lesson 2. How Annuals Prepare for Winter. Examine specimens of mustards, chickweeds, or other annual plants. How have they, or how are they preparing for next summer? In what form, and how do they pass the winter? Make a list of common annuals.

Lesson 3. How Biennials Prepare for Winter. Study the burdock, carrot, potato, and other biennial plants as to the provisions they make for living through the winter and producing seeds the next summer. What protects the underground part during autumn? Make a list of all common biennials. Are most of our food plants annuals or biennials? What perennials prepare for winter as biennials do?

Lesson 4. How Trees and Shrubs Prepare for Winter. Discuss the preparation of trees for passing the winter. How do evergreens provide for passing the winter? Why do most trees and shrubs drop their leaves? What other preparations do trees and shrubs make?

Lesson 5. Seed Vessels. Obtain specimens of the fruits of common plants, as bean, pea, locust, milkweed, poppy, pansy, radish, and other plants. Classify the fruits into nuts, legumes, pods, capsules, key fruits, akenes, berries, hips, pomes, drupes, and cones. Give examples of each.

Lesson 6. Seed Dispersal. Study different seeds and fruits as to devices for securing dispersal. Give examples of those carried by winds as winged and tufted seeds, (2) those carried by birds as berries, (3) by animals, as fruits with burs, (4) those carried by water, (5) explosive fruits.

Lesson 7. Some Plant Diseases. Obtain specimens of fruits showing mildews and rots, of apples showing scab, of cherry or plum twigs showing black knot, of green leaves showing rusts, and of other specimens showing disease of some kind. Discuss the damage done by these diseases, what the diseases really are, and how they are carried by spores.

Lesson 8. Relation of Insects to Plants. Secure specimens of raspberry or other fruit cones damaged by borers, of apples containing larvæ, of apple twigs covered with scale insects, and other specimens damaged by insects. Discuss in a general way the damage caused by insects to plants. Are any insects beneficial to plants?

General. Make drawings of fruits. Compositions on subjects connected with Nature in November. Estimate the amount and value of apple crops of the district.

GRADE 7.—DECEMBER.

Lesson 1. The English Sparrow. From observations, specimens, and pictures, describe the size, plumage, and general features of the English sparrow. Distinguish between males and females. Discuss the habits of the bird and its relation to plants, insects, and other birds. Is it a useful or harmful bird?

Lesson 2. The Ruffed Grouse. From pictures, and the previous observations of pupils, describe the plumage, size, and other features of the ruffed grouse, commonly called partridge. Discuss its food, nesting habits, life during the winter, and its value for food purposes.

Lesson 3. Hawks. From previous observations and pictures describe the general size, form, plumage, food, and habits of hawks. Distinguish several common species. Discuss their relation to the farm-yard. Are they harmful or beneficial? How do they pass the winter?

Lesson 4. Owls. Describe owls as to general shape, colors, food, and habits. Distinguish several common species. Where do they spend the winter? Which species is seen here only during winter? Discuss the relation of owls to other animals. Should they be protected?

Lesson 5. Balance of Power Among Animals. Estimate the number of English sparrows in five years from one pair if there were no deaths, and each pair hatched five settings of eggs of eight eggs each every year. How would such an increase affect conditions in the world? What prevents a continual plague of frogs, grasshoppers, and flies? How is the proper balance of power maintained?

Lesson 6. Animal Parasites. What is the meaning of the term "parasite?" Discuss the relation of small animals to larger ones. Give examples of smaller animals living on or in larger animals. Make a list of each kind. What animals are found on sheep, dogs, horses, and chickens? What are the following and where are they found—mite, louse, flea, botfly, and tapeworm? What causes "scab" in sheep?

Lesson 7. The Teeth of Animals. Make drawings on the board of the teeth of different animals typical of different groups, and describe the structure and shape of the teeth in relation to the habits of the animal. Consider the dog, cat, bear, cow, horse, and squirrel. Use pictures.

Lesson 8. The Feet of Animals. From observations of live animals, pictures, and blackboard drawings, discuss the structure and uses of the feet of different animals illustrating different groups, as the dog, cat, bear, cow, squirrel, horse, and bird groups. Discuss the relation of the form and structure of the feet to the animal's habits.

General. Make sketches of the landscape in December. Observe the weather changes. In the arithmetic classes estimate the cost of the yearly keep and returns with profit or loss from a cow, hen, or sheep.

GRADE 7.—JANUARY.

Lesson 1. Space, Volume, and Matter. Push some tissue paper into a wide-mouthed bottle or glass, then force the bottle, mouth downward, into water. Try a similar experiment with paper in a tube open at both ends. Notice and discuss the results. Lead up to a definition of space, volume, matter, and body.

Lesson 2. Substance, Mass, and Weight. Point out several bodies each of which is made of a different kind of matter. What are substances? What is the amount of matter in a body called? How is the mass of a body measured and what is this called?

Lesson 3. Force, Energy, and Work. Move a body up and down, or backward and forward, until you feel tired. What term is applied to that which changes the position or motion of a body? What is the ability to exert force called? What kind does a person possess? What is a person or machine doing when it is exerting force and losing energy?

Lesson 4. Molecules. Fill a test tube or bottle with colored water, and through a hole in the cork run a small tube. Apply heat. Notice the water rise in the tube. Argue that the water must be made up of small parts called molecules which are driven apart by heat. Why are railway-rails shorter in winter and longer in summer?

Lesson 5. Cohesion and Adhesion. Break a piece of chalk, wood or ice. Why was it necessary to exert force? What is the force which holds like molecules together called? Why will the broken pieces not cling together again? Why does a postage stamp cling to a letter? Distinguish between cohesion and adhesion.

Lesson 6. The Properties of a Body. Examine pieces of wood, iron, glass, and sugar. What is meant by the term property? What are the properties of each substance examined? What are the properties of water?

Lesson 7. Solids, Liquids, and Gases. Observe the properties of a piece of wood, water, and air. Pour each from one dish to another. Which retains its form and volume, which retains its volume only, which tends to retain neither its form nor volume? Distinguish between solids, liquids, and gases.

Lesson 8. Solution and Fusion. Put some sugar in water and shake. What term is applied to the change taking place in the sugar. What term is applied to the mixture of sugar and water? Distinguish between the terms dissolve, soluble, solvent, and solution. Apply heat to sugar or ice. What change takes place? What is the change called?

General. Keep a weather record during January. Observe and name the winter birds. In the geography lessons compare winter life in Canada with winter life in other countries. Write a composition on the "Lumber Industry."

GRADE 7.—FEBRUARY.

Lesson 1. Distillation. Dissolve some salt in water in a test tube. Connect the test tube by a rubber or glass tube with a dish surrounded by ice. Collect and taste the drops of water in the dish. What is distilled water? What is steam? Distinguish between evaporation, condensation, and freezing or solidification.

Lesson 2. Capillarity and Surface Tension. Dip a tube with a fine bore in colored water. Try tubes with bores of different sizes. In which does the water rise highest? Why is this called capillarity? Try to float a dry needle on still water. Then wet the needle. Explain surface tension.

Lesson 3. Electrical Energy. Suspend small paper or pith balls by silk threads. Hold a rubber comb and a glass rod near each ball. Rub the comb and rod with a piece of silk or flannel and hold each near the balls. Argue that the comb, or rod acquired a new energy called electrical energy. Try other substances such as sealing-wax or sulphur.

Lesson 4. Different Kinds of Electricity. Try rubbing a rubber comb with flannel and a glass rod with silk. Try the rubber, glass, silk, and wool on the pith ball. Notice the repulsion after the pith ball touched each substance. Argue that there are two kinds of electricity, positive and negative.

Lesson 5. How to Electrify Bodies. Touch electrified bodies with the fingers or with metals. Why do they lose their electricity? Distinguish between conductors and non-conductors of electricity. Make a list of each. Why are the pith balls suspended by silk threads? Discuss electrification by friction, by contact, and by induction.

Lesson 6. Thunder and Lightning. Discuss the electrification of particles of water by friction when ascending to form clouds, the formation of clouds, electrified oppositely, the passing of electricity from one to the other or to the earth, and the resulting thunder and lightning. What is thunder? What is lightning? Why is lightning seen sometimes when no thunder is heard?

Lesson 7. Insulators and Lightning Rods. Discuss and illustrate the use of insulators on telegraph and telephone poles. Why are they necessary? Of what materials must they be made? Explain the use of lightning rods in protecting houses by leading the electricity into the ground.

Lesson 8. Uses of Electricity. Discuss the general uses of electricity in furnishing heat and light, running machinery, in telegraphing and telephoning, and for other purposes.

General. Notice the tracks of animals in the snow and other evidences of their winter life. What birds are seen during this month? Composition on "Uses of Electricity."

GRADE 7.—MARCH.

Lesson 1. Magnetic Energy. Hold either pole of a magnet close to each of several bodies, as small pieces of steel, wood, paper, glass, and iron. Argue that the magnet has a kind of energy called magnetic energy. What parts of the magnet possess most energy?

Lesson 2. How to Make a Magnet. Rub a knife blade a number of times with one pole of a magnet, always rubbing in the same direction. Bring the blade close to several substances which were attracted by the magnet. Explain the results.

Lesson 3. The Mariner's Compass. Rub several needles repeatedly, some with one pole of the magnet and some with the other pole. Lay each carefully on a piece of cork floating on water. Do they arrange themselves in the same or different directions? Why do they point north and south? Explain the terms magnetic meridian and magnetic poles.

Lesson 4. The Force of Gravity. Hold a number of different bodies in your hand, and then relax your hold of them. Argue that some force must be acting on them. What exerts the force and what kind of force is it? With what force does the earth attract your body?

Lesson 5. Specific Gravity. Find the weight of a bottle. Fill the bottle with sand and find the weight of the sand. Divide the weight of the sand by the weight of the same volume of water. The quotient is the specific gravity of sand. What is the standard or specific gravity for liquids and solids? What is the standard for gases? Argue that specific gravity is not weight.

Lesson 6. Heat Energy. Hold a piece of copper or iron wire in a flame. Hold a glass rod in the flame. Why does the end become hot in one case and not in the other? What is heat? What is the chief source of our heat? Mention the different ways by which heat can be obtained. Argue that heat is not matter.

Lesson 7. Light Energy. Why cannot one see objects in the dark? What is light, an energy or matter? What bodies give forth light? What part of the day is brightest? Why? In what direction does light travel? Account for shadows. What colors may light rays have? Why are those from the sun white?

Lesson 8. Sound Energy. Rub the teeth of a comb slowly with a pencil. Stretch a string tightly and make it vibrate. Argue that sound is caused by the vibration of an object. How is the sound transmitted from the object to the ear? Account for the different pitches of sound. What effect has distance on sound?

General. Draw a form for a spring nature calendar and begin to record nature observations, as the first flow of sap, the first bird, insect, and flower. Plant pansy, onion, and other seeds for early plants, in pots or boxes. Write a composition on "The Mariner's Compass."

GRADE 7.—APRIL.

Lesson 1. The Properties of a Mineral. Compare several minerals as to color, lustre, taste, heaviness, hardness, color of streak, crystals, cleavage, effect of water, effect of heat, effect of magnet, effect of hydrochloric acid, and other properties. Make a list of the different properties of a mineral to be noticed.

Lesson 2. Quartz and Its Varieties. Study in detail a piece of mil' quartz and describe all its properties. What are its distinguishing properties? Mention the different varieties of quartz, as rock crystal, jasper, smoky quartz, and others.

Lesson 3. Limestone and Its Varieties. Study in detail a piece of marble, and describe all its properties. What are the distinguishing properties of limestones? Observe and test other varieties, as chalk, grey limestone, vein limestone, and shells.

Lesson 4. Mica. Study in detail a piece of mica and describe its properties. What effect has heat on it? What is the distinguishing property of mica? What use is made of mica?

Lesson 5. Felspar. Study in detail a piece of felspar and describe its properties. Notice that the sides are at right angles to each other. Which is harder, quartz or felspar? Account for the color of red granite.

Lesson 6. Hornblende. Study in detail a piece of hornblende, and describe its properties. What are the distinguishing properties of the mineral. With what other minerals is it often associated?

Lesson 7. Some Common Rocks. Distinguish between a true mineral and a rock. Make general observations of specimens of common rocks, as granite, slate, sandstone, and conglomerate (pudding-stone). What minerals may be distinguished in granite? What is a distinguishing feature of each kind of rock?

Lesson 8. The Uses of Rocks and Minerals. Discuss the uses of different rocks in laying foundations and for the super-structure of buildings. What rocks or minerals are chiefly used for these purposes? Discuss the use of limestone in making lime, of varieties of quartz for jewelry, of mica for stove doors, and of granite and marble for monuments and ornaments.

General. Continue observation of birds, insects, and plants. What birds have returned? What flowers have blossomed? Compositions on "Spring," "Stream Driving," and "Spring Work on the Farm." Make preparations for gardening. Draw a plan of the garden.

GRADE 7.—MAY.

Lesson 1. The Earth's Surface in Spring. Discuss the changes in the surface of the earth that have taken place since last autumn as a result of alternate freezing and thawing, the cold weather of winter, and the work of water in spring. What effect have these changes had on the soil? What part do they play in the making of valleys, hills, and the exposure of rocks? What changes in the plants are noticed?

Lesson 2. How Soils are Made. Examine some garden soil. Touch it with acid. Look for grains of quartz. Account for the reddish or yellowish color of some of the material. What minerals can you find in it? Try to burn some soil. Explain that the part which burns (called humus) is chiefly decayed vegetable matter. Shake some soil in water in a bottle and allow it to settle. Discuss the origin and the agencies concerned in making soils from minerals, rocks, and plants.

Lesson 3. Wells, Springs, and Pure Water. Distinguish between a well, a spring, a stream, a pond, and an artesian well. Make diagrams on the board to illustrate each. What is the source of water in each? In which should the water be purer? Which is more readily contaminated by sewerage? Which gives the best water?

Lesson 4. The Return of the Birds. Discuss the return of the birds and the causes or object of their return. Make a list of those already reported, with a brief description of each. What food do the birds obtain in April?

Lesson 5. Insect Life in April. Make a list with descriptions of the insects already reported. Where, and in what condition has each passed the winter? Why are flies not so numerous in spring as in autumn? How do mosquitoes pass the winter?

Lesson 6. The Dog's-tooth Violet. How was this plant able to bloom so early in the spring? How many flowers and foliage leaves does each plant bear? Where were the flowers and leaves last winter? Of what use to the plant is the bulb? Describe fully, and draw the complete plant.

Lesson 7. The Lily Family. Study a trillium and compare it as to leaves and flowers with a dog's-tooth violet, and with bellwort and other members of the lily family. In what respects do they agree? Give the chief characters of the members of the lily family.

Lesson 8. The Trees in May. Bring specimens of the leaves and flowers of trees. Study and draw the leaves of several and give the common names. What trees blossom during May? What trees sent out the flowers before the leaves? What trees blossomed first?

General. Continue the spring nature calendar. Observe Arbor Day by planting trees, shrubs, and flowers. Prepare and plant the garden.

GRADE 7.—JUNE.

Lesson 1. An Apple Blossom. Distribute apple blossoms to each member of the class. Find the four circles of the flower and the parts of each circle. How many parts in each circle? Compare the apple blossom with the trillium flower. Look for evidences of pollination by wind or by insects.

Lesson 2. A Strawberry Blossom. Study a strawberry blossom and compare it with the apple blossom as to adhesion and cohesion of parts, and the general structure. How many carpels are there? What part of the plant is the fleshy part of a strawberry? Where are the seeds of a strawberry?

Lesson 3. The Rose Family. Let each pupil place side by side specimens in bloom of three plants of the rose family, as strawberry, apple, plum, cherry, or other member. In what particulars do the stems and leaves agree? Compare the flowers and notice all the resemblances and differences. What are the chief characters of the rose family? Name other members of the family.

Lesson 4. The Nesting Habits of Birds. From the observations of the pupils, from specimens and from pictures, describe the nests and discuss the nesting habits of some common birds, as crows, sparrows, blackbirds, goldfinch, summer yellowbird, humming-bird, swallows, and others.

Lesson 5. The Life and Habits of the House Fly. From specimens and pictures describe in a general way the four stages in the life of a house fly, the habits of the adult, and the relation of its habits to diseases.

Lesson 6. The Life and Habits of the Mosquito. From specimens and from pictures describe the different stages in the life of a mosquito. Discuss the habits of the adults in relation to diseases. How do you distinguish between male and female mosquitoes? Do both bite?

Lesson 7. Household Pests. In addition to flies and mosquitoes what other insects give trouble in the dwelling house? Discuss in a general way the habits of bed bugs, clothes moths, and carpet beetles, the damage they do, and how to destroy them.

Lesson 8. The Apple-tree Tent-Caterpillar. Bring in apple twigs showing specimens of the larvæ of the tent-caterpillar. From specimens and pictures study its life history and habits. What damage does it do and what may be done to prevent it?

General. Continue work in the garden. Finish the nature calendar observations. What birds are not seen until June? What flowers are in blossom in June?

GRADE 8.—SEPTEMBER.

Lesson 1. The Sweet Pea Plant. Each pupil should have one or more flowers and a part of the stem bearing leaves. There should be at least one complete plant. Notice the fibrous roots and the nodules, the winged stem, the compound leaves with tendrils, and the shape and structure of the flowers. Make drawings.

Lesson 2. The Red Clover Plant. Examine specimens of the entire plant. Look for nodules on the roots. Describe the leaves and draw one. Distinguish between the head of flowers and a single flower. Compare one flower as to shape and structure with a sweet pea flower.

Lesson 3. The Pulse Family. Compare the fruits (pods) of peas, bean, locust, clover, vetch, and other plants bearing pods. How does a pod (called a legume) from those studied differ from other fruits? Mention all the characteristics which are common to the roots, leaves, flowers and fruit of pea, bean, clover, vetch and other plants of the pulse family.

Lesson 4. Nodules and Their Use. Examine the roots of several members of the pulse family. Do all possess swellings on the roots called nodules or tubercles? Discuss the use of these nodules as homes for bacteria which store up nitrogen in the plant.

Lesson 5. The Common Sunflower. Study in a general way the stem, leaves, and flowers of the sunflower plant. Notice in particular the head of flowers. Distinguish between ray florets and disc florets in the head. Which are perfect and which imperfect flowers? Observe the rows of bracts surrounding the head of flowers.

Lesson 6. The Aster Family. Make general observations on the flower heads of asters, dandelions, chicory, and other members of the aster family. In each head look for perfect and imperfect flowers. Describe the fruit in each plant. Compare it with a sunflower fruit. What things in common have members of the aster family? Give examples of the family.

Lesson 7. The Indian Corn Plant. Examine the structure of a place of corn stalk. Notice the veining and arrangement of the leaves. Where do the leaves arise? Examine the remains of the staminate flowers at the top of a stalk. Trace the silky threads which hang out from the top of an ear. Of what use were these threads? Examine an ear and notice the number and arrangement of the fruits called grains.

Lesson 8. The Grass Family. Make general observations of the complete plants of timothy, foxtail or other grasses, and of wheat, oat or barley plants. Compare them as to stem, leaves, and fruits with the Indian corn. Why are all grains called "corn" plants? What are the general characters of members of the grass family?

General. Collect, press, and mount specimens of clovers and grasses, and other members of the pulse and grass families. Put the garden in condition and notice the results of experiments. Observe effects of insects, birds, or plant diseases in the garden.

GRADE 8.—OCTOBER.

Lesson 1. Some Noxious Weeds. Have pupils bring specimens of weeds found n their gardens, in grain fields, in the barnyard, and in other places. Notice one or two distinguishing features of each. Teach the common names.

Lesson 2. Objections to Weeds. Consider the weeds studied in the previous lesson and discuss the objections to them, as (1) they use plant food, (2) crowd other plants, (3) offend the eye, (4) increase expenses.

Lesson 3. Eradication of Weeds. Discuss the eradication or elimination of weeds from gardens, fields and roadsides by (1) not allowing them to seed, (2) not sowing wild seeds, (3) spudding and cutting, (4) cultivation, (5) applying salt or other substances.

Lesson 4. Rotation of Crops. Discuss the rotation of crops from the standpoint of (1) influence on preservation and increase of plant food, (2) as affecting the enemies of plants, (3) profit. Suggest a possible three-year or four-year rotation.

Lesson 5. Some Common Ferns. Provide each pupil with a frond showing fruit-dots of polypody, spinulose wood, Christmas or other fern. On a complete plant observe the roots and the underground stem (rootstock). Compare a frond with a leaf. Notice the brownish bodies called fruit-dots bearing spores. Compare the spores with seeds as to appearance and use. Teach the names of several common ferns.

Lesson 6. Other Flowerless Plants. Obtain specimens of club-mosses, true mosses, and horsetails. Compare them with ferns as to parts and method of reprodution. Look for spore cases and spores in each plant. Distinguish club-mosses, true mosses, horsetails, mushrooms, lichens, and other flowerless plants.

Lesson 7. Plant Diseases. Examine specimens of apples showing scab, of potatoes showing scab, of grapes or plums showing mildews, of grain leaves showing rusts. Discuss the causes of these diseases. Point out that each disease is a low form of flowerless plant propagated by spores.

Lesson 8. Bacteria and Their Ways. Compare sweet milk with sour milk. Discuss (1) the different changes which take place in milk, as souring, curdling, and other changes, (2) the souring and fermentation of preserves, (3) the making of cider. Discuss the work and habits of bacteria which cause the changes mentioned.

General. Put the garden in condition for winter. Calculate the yields and profits per acre of common crops grown in the district. Observe the preparation of plants and animals for winter. Composition on "Weeds."

GRADE 8.—NOVEMBER.

Lesson 1. Study of an Apple. Supply each pupil with a specimen of one kind of apple. Distinguish and study the form, size, stem cavity, basin, calyx, color, dots, bloom, and skin of the apple. Cut the apple across and observe the color, texture, and flavor of the flesh, the core with its carpels, and the number and size of the seeds.

Lesson 2. Different Varieties of Apples. Observe the distinguishing features and learn the names of several common varieties of apples, as Fameuse, Alexander, McIntosh Red Wealthy, and other varieties.

Lesson 3. A Score-Card for Apples. Study several specimens of the same variety and notice the good or bad points of each specimen. Score several plates of the same variety, placing each plate as first, second, or third, allowing 10 for size, 25 for color, 20 for freedom from disease, 20 for texture and flavor, and 25 for uniformity and trueness to type.

Lesson 4. Classification of Fruits. Make a list of all common fruits. Classify them as berries (strawberry), drupes (plums), aggregate fruits (blackberry), pomes (apple). Give a definition and examples of each class.

Lesson 5. Storage of Fruits. Discuss the storage and keeping of common fruits for winter use. How can each fruit be kept longest and in best condition? What are their requirements as regards moisture and temperature of the air? What varieties of apples keep longest?

Lesson 6. The Uses of Fruits. Discuss the uses made of common fruits. What fruits are raised for man's food? Which need to be cooked? Which are eaten raw? What useful fruits grow wild? Discuss the use of fruits for making drinks, for flavoring, for condiments, for medicine, for making preserves, jam, and jelly. Are any used for perfume?

Lesson 7. Pruning Trees in Autumn. What is meant by the term "pruning?" Why do trees need pruning? Compare an unpruned tree with a pruned one as to twigs and leaves, and the bearing of fruit. Discuss time of year and best method in pruning trees. Illustrate by diagram on the board.

Lesson 8. Protection of Trees in Winter. Discuss the different ways by which man can assist the trees to pass the winter, as covering the roots with a mulch of straw or manure, pruning off heavy branches, wrapping paper or wire netting around the trunk, and hilling up the earth around the lower trunk. Of what use is the mulch? Of what use is the paper or wire?

General. In the arithmetic classes work problems bearing on fruit growing, e.g., what will it cost per acre to set an apple orchard if young trees cost 25 cents each, and are planted in squares 36 feet apart? Observe the preparation of animals for winter. Composition on "Uses of Fruits."

GRADE 8.—DECEMBER.

Lesson 1. How Plants Spend the Winter. Cut twigs from both evergreen and deciduous trees. What is present on both kinds of twigs? Notice the small size and the covering of balsam on evergreen leaves. Examine the buds on the twigs. What do they contain? Look for light-colored specks on the bark called lenticels or breathing-pores. Discuss the life of trees during winter.

Lesson 2. How Insects Spend the Winter. Obtain specimens of dormant flies, of cocoons, of pupa-cases, and of insect eggs, as those of the tent-caterpillar on apple tree twigs. Discuss the different forms in which insects may pass the winter and give examples of each. How do house flies, mosquitoes, June beetles, cabbage butterfly, cecropia moth, and other common insects pass the winter?

Lesson 3. Contents of a Potato Tuber. Cut a tuber crosswise. Find the parts corresponding to the pith, wood, and bark of an ordinary stem. Feel and taste the watery fluid; test it with blue litmus paper if possible. Make a pulpy mass of the flesh, put it in a cloth and squeeze out the juice. Heat a little of the liquid and notice presence of albumen. Test some of the white substance that settled to the bottom of the juice for starch. What was the material left in the cloth? Argue that a potato contains water, albumen, starch and cellulose.

Lesson 4. Potato Diseases. Examine closely several potatoes, good ones and bad ones. Why are some considered bad? Look for common scab, powdery scab, rot, and signs of other diseases. Discuss the diseases of potato plants, as blights, rusts, rots, and scabs, and the use of sprays to prevent them.

Lesson 5. Scoring Potatoes. Examine two or three specimens from different lots of the same variety. Score them, allowing 20 for size, 10 for shape, 5 for color of skin, 5 for color of flesh, 20 for surface, 20 for eyes (number, distribution and depth), and 20 for freedom from blemishes.

Lesson 6. Contents of a Grain of Wheat. Have ordinary wheat flour which is obtained by crushing grains of wheat Mix some flour with water in a dish. Put the dough in a cloth and pour water on it. Work the dough. What is left is gluten. Test the liquid with iodine for starch. Argue that a grain of wheat contains both starch and gluten.

Lesson 7. Seed Selection. Provide each pupil with a number of grains of wheat, of oats, or of other grains. Select the largest, most plump, cleanest, and best formed seeds from each lot. Discuss the importance of selecting good seed for planting

Lesson 8. Scoring Grains. Score different samples of wheat, allowing 20 for purity, 20 for hardness and texture, 15 for freedom from weed seeds and dirt, 10 for freedom from musty or smutty grains, 10 for uniformity and plumpness, 10 for color and brightness, and 15 for weight.

General. Continue arithmetical questions bearing on agricultural operations. Observe the winter conditions of trees and birds. Draw the landscape in December.

GRADE 8.—JANUARY.

Lesson 1. The Parts of an Egg. Examine an egg. Notice its shape and the color of the shell. Tap the egg on the broad end. Strip off the pieces of shell and notice the thickness and brittleness. Notice the thin, soft, smooth skin within the shell. Break the egg into a cup, and describe the yolk and the white of egg. Notice the germ spot.

Lesson 2. Scoring Eggs. Compare several eggs, both fresh and stale, as to size and color, and lustre of the shell. Place them in water and notice positions taken. Hold the eggs toward the light and look through them. Notice the size of the air-space in the large end. Classify the eggs as excellent, good, fair, and bad.

Lesson 3. The Parts of a Fowl. Make on the blackboard a diagram of a hen or rooster. Mark the different parts, as comb, beak, wattles, lobes, neck, tail coverts, tail primaries, tail, fluff, wing coverts, wing primaries, breast, thigh, heel, tarsus, spur, and toes. Practise drawing and marking in the different parts.

Lesson 4. Keeping Poultry. From observations at home and from pictures discuss the general characters of several common breeds kept in the district. What breeds are best for laying eggs, and what for the flesh? Discuss the housing, feeding, and general care of poultry.

Lesson 5. What Milk Contains. Examine a specimen of milk that has been set aside for a few hours. What is cream, butter fat, and skim milk? Test some milk that had soured with litmus paper. What kind of acid does it contain? Examine a piece of cheese. Of what in the milk is it made? What is whey? What makes new milk sweet? Burn a piece of curd. What is left? What are the constituents of milk?

Lesson 6. Testing Milk. If possible borrow a Babcock tester and test some samples of milk, or describe the Babcock tester. Work several examples, e.g., How many pounds of butter-fat in 5,000 lbs. of milk that tests 4%.

Lesson 7. The Care of Milk. Discuss the entrance of dirt, bacteria, bad flavors, and bad odors in milk caused by improper food, impure drinking water, and lack of cleanliness in handling the milk. What are the essentials in caring for milk? Make a list of the precautions which should be taken to prevent the entrance and growth of bacteria.

Lesson 8 Milk Products. Review the composition of milk. Consider its value as a food for animals. What part is used chiefly in making butter or cheese? Discuss briefly the methods of separating the different substances from milk in making cheese or butter. What is condensed milk?

General. In the arithmetic classes work problems bearing on the lessons of the month. Start farm book-keeping sets involving the keeping, and the profits from cattle, poultry, and sheep.

GRADE 8.—FEBRUARY.

Lesson 1. The Parts of a Horse. Make a drawing of a horse on the blackboard, with the parts marked; or use a good picture. Study the picture or drawing and locate the neck, withers, back, loin, hip, dock, throat, shoulder, breast, forearm, arm, wart, knee, cannon bone, fetlock, pastern, hoof, toe, chest, ribs, belly, flanks, stifle, thigh, and hocks. Let each pupil make a drawing and mark in the parts. Practice locating these parts on the horse at home.

Lesson 2. A Good Driving Horse. Discuss the general requirements of a good driving horse. In connection with the requirements discuss the importance of color, height, neck, chest, withers, loins, croup, thighs, buttocks, legs, hocks, and other parts. What breeds of horses are best for driving purposes?

Lesson 3. A Good Draft Horse. Discuss the general requirements of a good draft horse. Of what importance in the draft horse are the points discussed in connection with the driving horse? Name, and point out some characteristics of common breeds of draft horses, as Percheron, Belgian, English Shire, and Clydesdale.

Lesson 4. The Parts of a Cow. From a drawing on the board, or from a good piture, locate and name the chief parts of a cow, as muzzle, nostrils, face, forehead, cheek, jaw, neck, withers, back, loin, pinbone, rump, hips, tail, chest, brisket, throat, shoulder, forearm, knee, pastern, foot, chest, ribs, belly, flank, milk veins, udder, quarters, thigh, escutcheon, cannon, and thigh. Draw and mark in these parts. Locate them on the cow at home.

Lesson 5. A Good Dairy Cow. Discuss the general requirements in a good dairy cow. Of what importance are the general form, skin, temperament, head, neck, ribs, stomach, udder, and other parts of a cow? What breeds fill these requirements well? What are distinguishing points in the Jersey, Guernsey, Ayrshire and Holstein?

Lesson 6. A Good Beef Animal. Discuss the general requirements of a good beef animal. What points or parts of the animal are of most importance? What are some distinguishing features of the Shorthorn, or Durham, Aberdeen Angus, Galloway, Hereford, or other beef breeds?

Lesson 7. The Parts of a Sheep. From a blackboard drawing or picture name and locate the parts of a sheep, as face, muzzle, nostrils, eyes, neck, top of shoulder, cheek, back, loin, twist, rump, dock, brisket, cannon, foreleg, shoulder, knee, foot, toe, foreflank, ribs, belly, flank, hip, and legs. Name the chief breeds of sheep, as Southdown, Shropshire, Dorset, Cheviot, Merino, and others. Which of these are kept in the district?

Lesson 8. The Parts of a Hog. From a blackboard drawing or picture locate and name the parts of a hog, as snout, eye, face, ear, jowl, neck, shoulder, foreleg, hind leg, breast, chest line, back, loin, side, tail, foreflank, hind flank, hips, rump, belly, ham, stiffle, hock, pasterns, dew claw, and foot. Name the chief standard breeds, as Chester White, Yorkshire, Tamworth, Berkshire, Cheshire, and others. Which are kept in the district?

General. Keep a weather record for the month. Practice naming the parts of a horse, cow, sheep, and hog.

GRADE 8.—MARCH.

Lesson 1. How Soils are Made. Discuss the work of the atmosphere, water in its different forms, land slides, frost, organic life, and chemical action in the disintegration of rocks and the formation of soils. Under water include the work of streams, underground water, oceans, lakes, ice, and glaciers.

Lesson 2. Different Kinds of Soil. Classify soils as regards manner of deposition as (1) sedentary or residual, (2) transported, and (3) alluvial. Give examples and discuss the general features of each kind of soil. What agencies are concerned in forming each kind? Which soil should be better for agricultural purposes?

Lesson 3. What Soils Contain. Study and compare specimens of gravel, sand, clay, lime, and leaf mould. Develop the thought that soils are made up chiefly of these in different proportions. If any one of these substances is very prominent the soils would be named accordingly, as gravelly, sandy, clay, calcareous (lime) or humous (leaf mould) soil. Which would retain water better. Which would contain most organic matter.

Lesson 4. Water in Soils. Distinguish between ground water which moves downwards, and capillary water which moves upwards. What soils convey water best? What soils absorb and retain most water? Discuss the use of soil water in dissolving plant food, in conveying plant food, and as a food for plants itself.

Lesson 5. Removal of Soil Water. Discuss the loss of water from soils by evaporation and by natural drainage. What harm results from too much water in a soil? If artificial drainage is necessary what are some of the methods? In what way does drainage benefit a wet soil?

Lesson 6. Air in Soils. Fill a bottle one-half full of ordinary soil, and shake the soil well, quickly pour on enough water to cover the soil. Notice the bubbles which rise. What do the bubbles contain? What effect would too much water have on the amount of air in soils? Discuss the relation of cultivation and drainage to air in the soil. Of what use is air in soils?

Lesson 7. Natural Manures. Discuss the addition of plant food to a soil by the decay of vegetable matter added by plowing under green plants and by adding barnyard manures. Of what use are marl, muck, and wood ashes? In what is each rich?

Lesson 8. Artificial Manures. Under this heading discuss the use of what are called commercial fertilizers. If possible examine samples of unmixed chemical fertilizers. Make a list, with remarks, of (1) those rich in nitrogen, as nitrate of soda (Chili saltpetre), sulphate of ammonia, dried blood, tankage, and fish scrap; (2) those rich in phosphorus, as phosphate rock or apatite, bone black, phosphate slag, and others; and (3) those rich in potash, as muriate of potash, wood ashes, and sulphate of potash.

General. Begin a spring nature calendar, and watch for the return of the birds, the swelling of buds, and other Nature observations.

GRADE 8.—APRIL.

Lesson 1. The Structure of Seeds. Leave bean and corn seeds in water over night. Observe dry bean seeds first. Notice the color, markings on the surface, the scar or hilum, and the little opening (micropyle). From the soaked seeds remove the coat or testa. Observe the cotyledons and the little plant with its plumule and cauticle. Study a corn seed in the same way and compare it with the bean seed.

Lesson 2. Germination Requirements. Place several good seeds on blotting paper in each of two pans or plates. In one keep the seeds completely covered with water; in the other keep the paper moist. Prepare similar plates and place one in darkness and the other in light, another out of doors in a cold place and the other in the house where it is warm. Observe plates from day to day. Discuss the requirements for seed germination.

Lesson 3. Testing Seeds. Rule lines on a piece of blotting paper and make 2-in. squares. In each of these squares place five or more of each kind of corn, pea, bean, beet or other seeds to be tested. Give them suitable conditions for germination. After several days notice results. What percentage of the seeds germinated?

Lesson 4. The Making and Use of Hot-Beds. If possible have the boys make a small hot-bed for the school, or encourage the making of hot-beds at home. Discuss the requirements, as regards frame-work, heat, and ventilation. What plants can be started in a hot-bed?

Lesson 5. Propagation of Plants by Cuttings. Obtain a few geranium or coleus stems and illustrate the making of soft-wood cutting or slips. Place these in water or damp sand until they root. Place a begonia leaf on damp sand, make cuts through the leaf and partly over the leaf with sand. Keep it covered with glass, and moist. Discuss the propagation of plants by cuttings.

Lesson 6. Propagation of Plants by Budding. Make two cuts, at right angles, through the bark of an apple stem, raise the edges of the bark, and place within an apple bud, retaining a little bark and wood of the stem from which it was removed. Bring the parts into close contact and tie with soft twine or raffia. The cuts may be covered with wax.

Lesson 7. The Making and Use of Grafting Wax. Provide about one-half pound of rosin, five ounces of beeswax, and three ounces of tallow. Melt these together in a tin vessel. When sufficiently cool pour into a pan of cold water, rub some tallow on the hands and knead and pull the wax until it assumes a light yellow color. Make it into rolls and cover with paper covered with tallow. Encourage children to make grafting wax at home.

Lesson 8. Propagation of Trees by Grafting. Illustrate out of doors, if possible, the grafting of a tree. Cut off squarely a one or two inch stem, split it and leave in a wedge, make a scion from a healthy twig, leaving the cut end wedge-shaped. Insert two scions in each stock so that the inner layers of bark (cambium) will be in contact. Cover the cut surfaces with grafting wax.

General. Continue the spring nature calendar. Notice in particular the return and habits of the birds. Make plans for gardening.

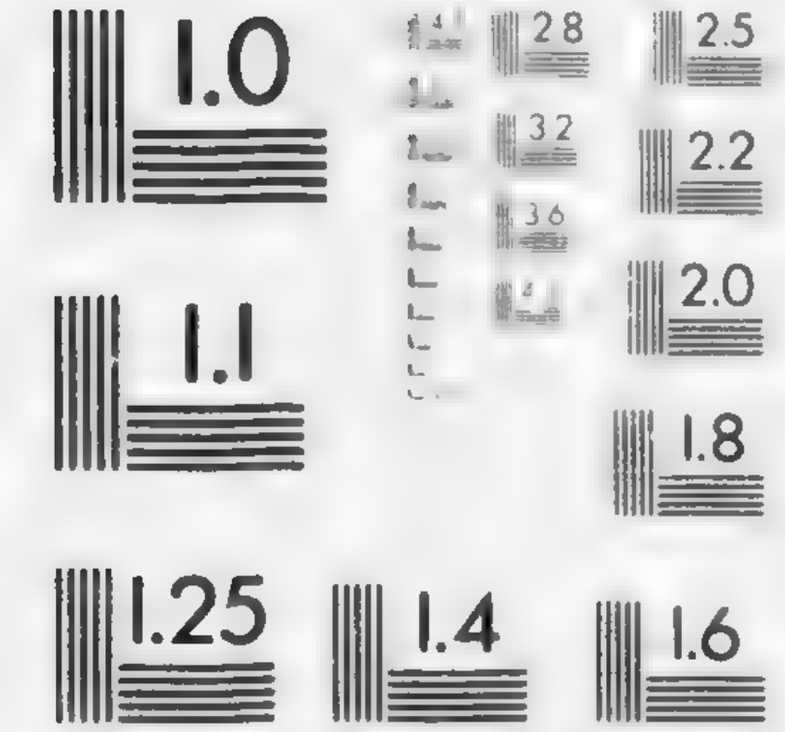
GRADE 8.—MAY.

Lesson 1. The Improvement of Plants. Discuss methods of getting better plants by carefully selecting the seed to be planted, by weeding out inferior seedlings, by giving good growing conditions as regards soil, light, and food, and by pruning and spraying.

Lesson 2. Pruning Trees in Spring. If convenient actually prune a small tree, by removing close to the stem certain limbs. Discuss the objects of pruning trees, what limbs to remove and the treatment of the wounds, also the advantages and disadvantages of both fall and spring pruning.

MICROCOPY RESOLUTION TEST CHART

ANSI and ISO TEST CHART No. 2



APPLIED IMAGE Inc

Lesson 3. Transplanting Plants. Transplant growing seedlings of cabbage tomato or other vegetable or flower plants from boxes or hot-beds to the garden. Make a list of rules as a guide to successful transplanting. Encourage work in transplanting at home.

Lesson 4. Preparation of the Seed-bed. In the garden prepare the beds for planting. Discuss the methods and importance of preparing a good seed-bed as regards (1) appearance of garden, (2) growth of seeds, (3) retention of water, (4) cultivation.

Lesson 5. Cultivation of the Garden. Discuss the value of tillage in general. Of what importance are depth and frequency of cultivation? Summarize the reasons for tillage, as (1) to pulverise soil, (2) to retain water, (3) to aerate soil, (4) to kill weeds.

Lesson 6. What Roots Take in and Give Off. Compare plants growing in a dry soil with those watered, also those grown in a very poor soil with those grown in a rich soil. Discuss the taking in of water and plant foods from the soil by roots. The foods which plants want most of are compounds of nitrogen, phosphorus, and potash.

Lesson 7. What Leaves Take In. Discuss the activity of leaves and the work of the little openings (stomates) in the leaves in taking in oxygen by day and by night, in breathing, and in taking in carbonic acid gas during the day. Point out that leaves do not take in water, but only oxygen, carbonic acid gas. Of what value is sprinkling or washing the leaves of plants?

Lesson 8. What Leaves Give Off. Place a dry test-tube over a folded leaf on a plant. Notice moisture in the morning. Discuss the giving off of water (transpiration) from the leaves, and the giving off of carbonic acid gas (breathing). Also point out that in sunlight growing plants give off the oxygen from the carbonic acid gas (CO_2) that the leaves take in.

General. Continue observations of birds, flowers, insects, and other things. Plant the garden and keep it in good condition. Observe Arbor Day by cleaning lawns, and planting trees and shrubs.

GRADE 8.—JUNE.

Lesson 1. Why Birds Should be Protected. Discuss the habits of some of our common birds as regards the kind of food they eat and where it is obtained. Classify common birds as seed eaters and insect eaters. Give examples of each class. Argue that all of our birds are beneficial except crows, blackbirds and the English sparrow.

Lesson 2. Some Beneficial Insects. Look on various weeds for ladybird beetles, which have red bodies spotted with black. Discuss their usefulness in devouring plant-lice. Are crickets, ants, grasshoppers, spiders and flies harmful or beneficial?

Lesson 3. Some Garden Pests. Look on garden plants and in the soil for insects injurious to garden plants, as potato beetle, turnip flea-beetle, cabbage worm, cabbage-root maggot, cutworms, white grubs, striped cucumber-beetle, squash bug, and others. Discuss in a general way the appearance and habits of those observed.

Lesson 4. Control of Garden Pests. In connection with each insect studied in the previous lesson discuss its control. How are potato beetle, cabbage worm, cutworms, squash bug, and striped cucumber-beetle best controlled?

Lesson 5. Some Orchard Pests. Obtain specimens of tent caterpillars, scale insects, plant-lice, currant worms, and other orchard pests. Discuss in a general way the appearance and habits of those obtained.

Lesson 6. Control of Orchard Pests. Consider the insects discussed in the previous lesson from the standpoint of control. What sprays are much used in orchards and when and how are they applied. What are the principal bush-fruits and how are they controlled?

Lesson 7. Some Field Pests. If possible obtain specimens of Hessian fly, joint worms, wheat-stem maggot, pea weevil, clover-root borer, cutworms, white grubs, or other field insect pests. Describe the appearance and habits of those obtained. What is the life-history of each?

Lesson 8. Control of Field Pests. Discuss methods of control in connection with each insect studied in the previous lesson. For grasshoppers, army worms, wire worms, cutworms and white grubs in particular what can be done to destroy them or control the damage done by them?

General. Study the landscape in June and try to represent in colors. Keep the garden in good condition and carry on simple experiments. Estimate the cost of preparing and planting the garden

LIBRARY—LIST OF REFERENCE BOOKS.

NATURE STUDY.

	Price.
"Handbook of Nature-Study," by Mrs. Comstock. Comstock Publishing Company, Ithaca, N.Y.	$ 3.00
"Nature-Study and Life," by Hodge. Ginn & Co. Boston	1.50
"Nature-Study Lessons," (4 books) by D. W. Hamilton. Renouf Publishing Company, Montreal. (In press)..	

AGRICULTURE.

"Agriculture through the Laboratory and School Garden," by Jackson and Dougherty	$ 1.50
"Rural School Agriculture," by Davis	1.00
Both by Orange Judd Co., New York.	
"One Hundred Lessons in Agriculture," by Nolan. Row, Peterson, & Company, Chicago	.75
"An Introduction to Agriculture," by Upham. Renouf Publishing Co., Montreal	.75
"Agronomy," by Clute. Ginn & Co., Boston	1.00
"Elementary Agriculture," by Hatch and Hazelwood. Educational Book Co., Toronto	.50
"School and Home Gardens," by Meir. Ginn & Co., Boston	1.00
"The School Garden Book," by Weed and Emerson. Charles Scribner's Sons, New York	1.00
"Elementary Agriculture and Nature Study," by Brittain. Educational Book Co., Toronto	.75
"Elementary Exercises in Agriculture," by Dadisman. The Macmillan Company, New York	.50

PLANT LIFE.

"How to Know the Wild Flowers," by Dana	$ 2.00
"How to Know the Ferns," by Parsons	1.50
"Our Native Trees," by Keeler	2.00
"Our Northern Shrubs," by Keeler	2.00
"Our Garden Flowers," by Keeler	2.00
All by Charles Scribner's Sons, New York.	
"How to Know the Wild Fruits," by Peterson. The Macmillan Co., New York	2.50
"Corn Plants," by Sargent. Houghton, Mifflin & Co., Boston	.75
"Beginners' Botany," by Bailey. The Macmillan Company, New York.	.60
"First Studies in Plant Life," by Atkinson. Ginn & Co., Boston	.75
"The Wild Flowers of Canada," by Hamilton. Dominion Book Company, Toronto. (In press)	
"Farm Weeds." Dept. of Agriculture, Ottawa	1.00
"Fodder and Pasture Plants." Dept. of Agriculture, Ottawa	.75
"Flower Guide," by Reed. Charles K. Reed, Worcester, Mass	75
"The Trees of Canada," by Hamilton and Prince. Dominion Book Company, Toronto. (In press)	

ANIMAL LIFE.

	Price.
"American Animals," Stone and Cram. Doubleday, Page & Co., Garden City, N.Y.	$ 4.50
"Squirrels and Other Fur-bearers," by Burroughs. Houghton, Mifflin and Company, Boston.	.60
"Bird Neighbours," by Blanchan. Doubleday, Page & Co., Garden City, N.Y.	.3.00
"Insect Life," by Comstock. D. Appleton & Co., New York.	2.00
"Handbook of Birds," by Chapman. D. Appleton & Co., New York.	3.00
"New Canadian Bird Book," by MacClement.	2.50
"Lessons on Birds," by Cornish.	1.00
"Common Birds of Eastern Canada," by Hamilton.	.50
All by Dominion Book Company, Toronto.	
"Bird Guide," by Reed. Charles K. Reed, Worcester, Mass.	.75

MINERALS.

"Rocks and Minerals," by Fairbanks. Educational Book Company, Boston.	.75

SCHOOL OF HOUSEHOLD SCIENCE.

Free Course for Farmers' Daughters of the Province of Quebec.

1. Commencing in September each year.

   One-Year Homemaker Course—open to young women 17 years of age and upwards.

   Two-Year Professional Housekeeper Course—open to young women 22 years of age and upwards.

2. Short Courses of from 10 to 12 weeks' duration, commencing in September, January, and March each year—open to young women 17 years of age and upwards.

The Government of the Province of Quebec grants fifty bursaries of $20 each to Quebec students taking the one-year and two-year courses, to be applied on account of board and lodging.

Board and Lodging, $4.00 per week.

SCHOOL FOR TEACHERS.

The School for Teachers gives a thorough training to those intending to teach in the English Speaking Schools of the Province.

Tuition free, and bursaries of $75.00 to $100.00 given those who promise to teach three years in an Elementary Rural School.

Board and Lodging, $4.00 per week.

Applications for admission should be made to Dr. G. W. Parmelee, Dept. of Public Instruction, Quebec, Que.

SCHOOL OF AGRICULTURE.

TWO-YEAR COURSE

Gives free instruction to farmers' sons of the Province of Quebec in:

Live Stock,

Horticulture,

Farm Crops,

Farm Management,

Farm Machinery,

Poultry,

Dairying, etc., etc.

All practical subjects for practical men.

Candidates are required:

1. To have passed their 17th birthday.
2. To produce certificates of physical health, including successful vaccination.
3. To have worked for a season (seed-time to harvest) on a farm.
4. To read and write the English language acceptably, to be proficient in the use of elementary mathematics, and to be acquainted with history and geography, especially of Canada.

FOUR-YEAR COURSE

A continuation of the foregoing for the training of specialists in the various branches of agriculture, leading to the McGill University degree of Bachelor of Science in Agriculture. The production of a University Entrance Certificate or the passing of a special entrance examination for this course is required.

Cost of board and lodging, $4.00 per week.

All Quebec students in Agriculture receive a grant from the Provincial Government of $7.00 per month of attendance, to apply on account of board and lodging.

Short Courses in Horticulture and Poultry Keeping will be given in February and March. Write for particulars.